

Fruit and Bread

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FRUIT AND BREAD.

A SCIENTIFIC DIET.

BY
GUSTAV SCHLICKEYSEN.

Translated from the German,

BY

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WITHOUT PAIN," "EATING FOR STRENGTH,"
"LIVER COMPLAINT," ETC.

WITH AN APPENDIX.

ILLUSTRATED.

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TRANSLATORS PREFACE.

OF works on food and cookery there is no end, but in most cases their writers regard man as an omnivorous creature, deriving his sustenance from the animal, the vegetable, and even from the mineral kingdom. The author of the present work has departed from the dietetic belief and practice of centuries, and has undertaken to prove, upon the ground of physical organization and original habit, that man is by nature frugivorous, using this word in its broadest sense, so as to include fruits, grains and nuts, and that these are sufficient to maintain him in a perfect condition of physical and mental health.

The arguments by which he maintains his theories are drawn from the accepted conclusions of modern science, and are presented with such originality and force as to entitle them to respectful consideration, even where his conclusions may seem too radical for adoption in the present state of society. His strikingly original treatment of the question of cookery will serve a useful purpose if it excites reflection concerning the present elaborate, costly and unnatural methods, regarding which there is, unquestionably, cause for a very radical reform. The system of diet and methods of preparing food which he recommends have been verified in his own experience for many years, and have, besides, the high merit of extreme simplicity and naturalness.

To the American reader the work will have an especial interest, as presenting in the main the views of a certain class of German health reformers, concerning whom

very little has hitherto been known in this country. It is a noteworthy fact that a parallel development of similar views has taken place in Germany, England and America having no direct connection, and yet reaching the same general conclusions, and it is hoped that the present translation may contribute in some degree to that international acquaintance and friendly exchange of thought which must essentially promote the common good.

A considerable number of English and American works of this character have been translated into German, but this is, so far as I am aware, the first translation of the kind from German into English. There are, however, a number of able German writers with whom it would be well for English and American hygienists to become better acquainted. The most prominent of these are Edward Baltzer, of Nordhausen, and Theodore Hahn, now of St. Gallen, in Switzerland. The cause of popular hygiene is also represented in Germany by a number of periodicals and by several influential societies.

This translation, while adhering faithfully to the spirit and meaning of the author, is not altogether literal, and at various points it has been somewhat elaborated by new material and by additional extracts from scientific authorities, especially from Darwin and Huxley.

In the Appendix will be found two valuable papers, one by Dr. James C. Jackson, who is so widely-known in the hygienic world, and one by Charles O. Groom Napier, F.G.S., which, it is hoped, may prove serviceable to the victims of intemperance.

I take pleasure in acknowledging here my indebtedness, in the translation of this work, to Mr. Edwin F. Bacon, who has been an instructor of the German language in my family during the past three years, and whose zeal and faithfulness in his profession are deserving of all praise.

NEW YORK, 1877.

M. L. H.

FRUIT AND BREAD.

PART I.

ANTHROPOLOGICAL ARGUMENT.

No task more closely concerns the life and health of man than that of providing for his nourishment. The consciousness of this necessity lies deeply rooted, not only in man himself, but in every other living creature, and is the cause of that "struggle for existence" which prevails throughout the entire organic world. But experience has shown that it is by no means a matter of indifference how and wherewith this nourishment is effected, for upon the quality and quantity of our food depend in a marked degree our physical and moral condition. It is therefore highly important that we possess a scientific foundation on which to estab-

lish a natural diet. The difficulty of establishing this foundation is indicated in the words of the distinguished Prof. Virchow, of Berlin, who, in the year 1868, said: "A scientific system of diet is as yet impossible." It is therefore no wonder that there should be a great diversity of opinion upon this question, and that even the learned should pursue different courses in their efforts to bring it nearer to a solution.

The Chemical Theory of Diet.—In modern physiology there has long existed a tendency to infer the necessary elements of food from the chemical composition of the living body, and to establish an artificial dietary upon this basis, but the study before us will show the fallacy of this method. As a foundation for a true theory, it is necessary first to consider the entire nature of the individual whose diet is to be determined.

If, for example, we had to determine the proper diet of a horse, and should to this end consider only the daily consumption of the albuminous products of flesh, and of phosphate of lime and other elements necessary to the formation of bone,

and should undertake to supply all these materials by means of albumen, flesh, salt, etc., we should very soon observe that an animal fed in this manner would perish, and it would thus become apparent that important considerations had been omitted. The same is true in the case of man. As long as we seek to establish a dietary for him upon the exclusive basis of the consumption of chemical substances, we shall arrive at no just conclusion.

The Anatomical Theory.—In order to correctly judge of the nature of an individual, we can find no better starting-point than that of his natural capacity to provide, digest, and assimilate food, and this depends upon his bodily structure. Hence, to ascertain the natural nourishment of a hitherto unknown animal, we have only to bestow a critical look upon his body in order to know what food is peculiar to him.

The objective knowledge of any given condition evidently assumes a knowledge of its previous history and of the processes by which it has been evolved; for as it is impossible rightly to estimate a thing in it-

self, without comparing it with at least one other, so is it impossible fully to understand a living organism without knowing the history of its development. In order, therefore, to a complete knowledge of the nature of man, we must undertake a somewhat complicated study. We have first to collect the necessary facts for a system of pure anatomy, and from these, through comparative anatomy, to derive scientific conclusions. We shall then have to consider the development of man, and this is twofold: first, that of the individual, or *Ontogeny*, and, second, that of the race, or *Philogeny*. Upon this plan it will be easy for us from the present standpoint of science to accomplish our proposed task.

The scientific method, and the conditions and results of nourishment, lead us to a comparative theory of dietetics. But such an attempt encounters to-day the same deadly opposition as did the theory of development previous to the appearance of Darwin's epoch-marking work, the "Origin of Species."

Ancient Zoological Theories.—The early scientists constructed their zoological systems

according to purely external appearances, and often in a manner entirely arbitrary, and in the highest degree unscientific. In like manner the theory of dieteties remains without a scientific basis, and even among the learned it is a proscribed subject. It cannot therefore surprise us if we encounter very antagonistic views concerning the influence of different foods on the health and development of man. The dietetic physiologists of the old school were too closely bound to the purely empirical views of their own and previous centuries, and possessed too little scientific material, to admit of their establishing sound theories.

The Darwinian Theory of Descent presents the entire subject in a new light. Like a fertilizing rain upon the parched earth, this new system descends upon the domain of science, awakening a new life in every department of knowledge, and involving therewith a bitter controversy with decaying forms. The year 1860 especially marks with us the dawn of this new epoch. Since then there has appeared a new literature, in which the discussion continually

turns upon the truth and possibility of the theories presented by Darwin, and since supported also by Vogt, Hæckel, Huxley, and others. A great conflict has thus arisen, in which there is an incessant appeal to high authorities. Now it is to Cuvier, now to Darwin, now to some dead system, now to living investigation. So echoes the conflict and so struggle the combatants, and with results so important to mankind that it is well worth the cost to take part, and that indeed in the interest of exact science.

The new theory has accumulated so much scientific material, the number of its adherents is already so great, and the influence which it exerts in every department of human knowledge so important, that every new scientific work is regarded and judged from the standpoint of its authority. Most of the sciences have, indeed, under its influence, suffered a complete revolution.

Philosophy finds for her speculations a real and scientific basis, and enters upon a boundless field of investigation. All natural sciences have received an impulse in the direction of unity. In morphology and biol-

ogy entirely new fields have been opened up, so that anthropology has become one of the most developed and important of sciences. History, from a dead, systematic dogmatism, has become a living source of knowledge; and philology, which has hitherto been occupied with the dry, unphilosophical and heartless details of grammar, is now, for the first time, brought into practical relations with material life and with the mental progress of our time.

Speculative theology, alone, takes no part in this great development, or, at most, in a negative way, seeks by a feeble opposition to save itself from total decay. The morning-red of knowledge which has dawned upon us through the theory of evolution prepares the old dogmatic and systematic schools in mental, moral, and physical life for their final departure, and accompanies them upon their way.

Application of the Theory of Evolution to Dietetics.—Least of all—indeed, we may almost say not at all—has the development theory been applied to dietetics, and, nevertheless, the possibility of such application is

so apparent, and the results which it promises so important, that it is indeed strange that none of the learned have as yet undertaken it. But a little knowledge of human nature will enable us to see why this field has hitherto been so sadly neglected. There has always existed a prejudice against the critical discussion of dietetic theories, and especially against the negation of long-established views, and hence the scientific treatment of the subject has been unpopular. Some, perhaps, who were capable of undertaking it, and who realized its importance, were deterred by its very magnitude and by the thoroughness of the changes which it involved; for it invaded the domestic circle, and demanded the relinquishment of favorite habits and enjoyments.

The present attempt to collect the material of a scientific system of dietetics, and to present it in a popular form, is prompted by a desire to share with my fellow-men the benefits which I have derived now for many years from the practical application of the views here presented. But I do not deceive myself with regard to human nature,

for I well know that there will be but a small minority who will go with me to the extreme, but, nevertheless, strictly logical, consequences of the proposed study. The effort must be that of a simple presentation of the truth, leaving each one for himself to apply it according to his individual ability and conviction.

In order, then, to establish a correct dietary for man, we must first gain a true knowledge of his nature, and this is only to be secured by the most conscientious and unprejudiced study. Let the simple facts bear their own testimony, and we shall then find all other departments of science in harmony with them. We might also well admit the testimony resulting from quiet reflection upon our own nature, our moral impulses, and our unperverted instincts; and if these finer sentiments are found to accord with the deductions of exact science, we may feel doubly assured of the soundness of our conclusions.

WHAT IS THE NATURE OF MAN.

Let us, first of all, by the presentation of fundamental laws, seek to answer this ques-

tion. While pure anatomy treats only of the physieal structure of animal bodies, comparative anatomy draws seientifie conclusions from the facts thus acquired, and to this comparative study we have now to direct our attention. Between man and the mammalia most nearly related to him there exist instructive points of relation and difference concerning the digestive apparatus, the food, and manner of life.

Every animal has his appropriate food, corresponding to his physieal structure; so that, in case of uncertainty as to the food, we have only to observe the bodily form, especially that of the extremities and the teeth, in order to decide; for, since the organism cannot exist solely within itself, it must possess the natural means of obtaining from without that which is necessary to its maintenance; and it is evident that the internal properties and the process of nutrition must correspond to the faculties whose action is external, and by which the means of nourishment are provided.

We have, therefore, as a first principle the following: *The proper food of every*

individual is indicated by his physical organization. In accordance with this principle we may classify animals according to their food; and, since all food is either of a vegetable or animal nature, we have as the two chief and general divisions the *Phytophaga*, or plant-eaters, and the *Zoophaga*, or flesh-eaters. This classification, however, is not strictly scientific, since there are various sub-classes, the food of which, though of a vegetable nature, is not always vegetable, and others whose food, though of an animal nature, is not always animal.

The Mammalia.—We will now first direct our attention to the mammalia. Of these a part subsist upon vegetable and a part upon animal food. To the former, the *Phytophaga*, belong the *Herbivora*, grass and herb eaters; the *Granivora*, or grain-eaters; the *Frugivora*, or fruit-eaters; the *Rodentia*, or gnawers; the *Edentata*, which lack front teeth; and others. Other classifications exist, as of those who subsist upon land and water plants, the *Ruminants*, etc., but we do not need for our present purpose to consider them. Among the *Zoophaga* or

flesh-eaters, we have the land and sea Carnivora, Insectivora, Omnivora, etc.

The intimate relation that exists between the structure of the digestive apparatus, the food, and the mode of life, appears, from the following considerations, in which we disregard at first the intermediate forms, and confine our attention to the chief divisions.

The Herbivora.—The Herbivora subsist upon grass and herbs. The genus *Bos*, which includes our common horned cattle, has thirty-two teeth. The under jaw has eight incisors, articulating with which there is a horny process at the front of the upper jaw. The incisors are shovel-formed, curved, and very sharp. Immediately back of these there is a considerable *diastema* or toothless space, and then in each half of both under and upper jaw six molars, in all twenty-four, of which the back ones are the larger. The masticating surface of these teeth has but little enamel. The food corresponds to the structure of the teeth. It consists of the various grasses, weeds, buds and flowers of all kinds, lichens, moss, swamp and water plants, and the like, and is torn from the stalk with the incisors and

masticated between the molars. The motion of the under jaw is obliquely lateral. The teeth of the horse are also an excellent example of the Herbivora. See Figure 1.

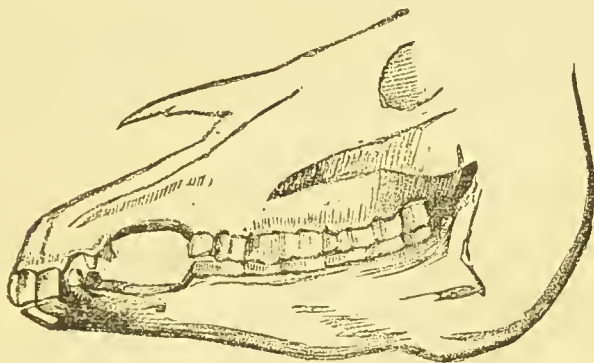


Fig. 1.—TEETH OF THE HORSE (Herbivorous).

The Frugivora (Fruit and Grain Eaters).*—The Frugivora are of a strikingly different character. As the best representatives of this class we may take the orang and gorilla. In these the teeth are alike in number and form, though differing somewhat as to size.

In each jaw there are four incisors, two pointed eye-teeth, four small and six large

*The term *Frugivora* is employed throughout this work in accordance with the German usage, and includes the two English classifications of Frugivora and Granivora; that is, all animals adapted to a fruit and grain diet.

molars, in all thirty-two. Each of the small molars has upon its articulating surface two blunt projections, and each of the large ones four. The eye-teeth project somewhat beyond the others and fit into a blank space in the lower row, the other teeth articulating uniformly. This is a significant fact with regard to nutrition.

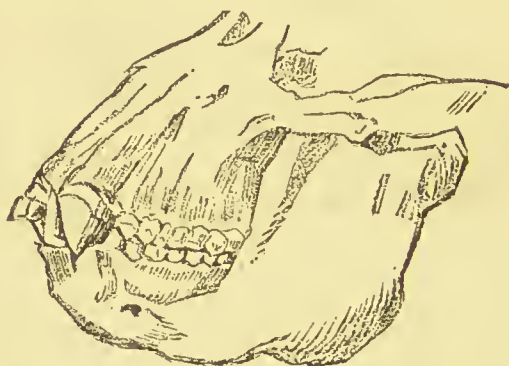


Fig. 2.—TEETH OF THE GORILLA (Frugivorous).

The food depends somewhat upon the locality, and consists of the various fruits, corn, small grains, and nuts. To this class belong the entire family of the Catarrhine monkeys, including the gorilla, orang, chimpanzee, gibbon, and other genera. Besides these, there are also fruit and grain eating bats and Marsupials, the teeth of which correspond to those of the other Frugivora.

The Rodentia.—The Rodentia is a pecu-

liar order of animals, characterized by two very long and strong teeth in each jaw, which occupy the place of the incisors and canines. Back of these there is a toothless space, and then four or five molars, which, when they have a roughened crown, indicate a vegetable, but when pointed, an insectiv-

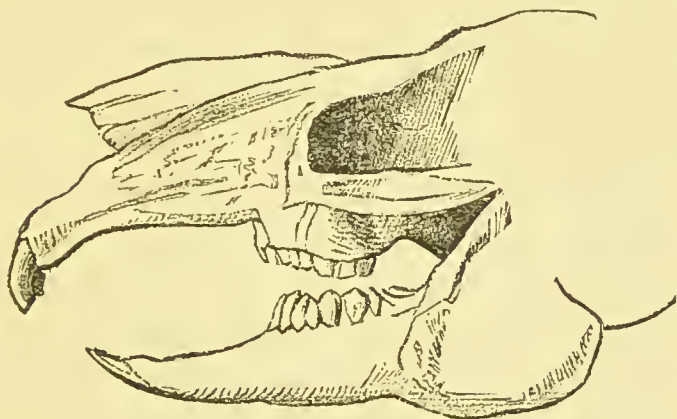


Fig. 3.—TEETH OF THE HARE (a Rodent or Gnawer).

orous, diet. Their principal foods are grains and seeds of all kinds, and with these often fruits, nuts and acorns. To this order belong the families of the squirrel, marmot, all species of mice, the beaver, porcupine, hare, and others.

An especial dietetic subdivision of the Rodentia is the Rhizophaga, or root-eaters,

which includes some species of the Marsupials, and of mice. The food often consists exclusively of the roots of the beet, carrot, celery and onions.

The Edentata.—The Edentata, or toothless order of the Phytophaga, have, sometimes, though rarely, rudimentary back teeth. Their food consists of leaves, blossoms, buds, and juicy stalks. Some also devour insects, especially ants. To this order belong the sloth, armadillo, pangolin, and great ant-eater.

The Carnivora.—The second great dietetic class of the animal kingdom is that of the Zoophaga, or flesh-eaters, the teeth of which are wholly different from those of the Phytophaga, or plant-eaters. This class of animals are characterized by a peculiar tooth, which is entirely wanting in the vegetable-eaters—namely, the long-pointed, or canine tooth. Accordingly as this tooth is more or less developed, the animal is more or less carnivorous. In proportion as this feature becomes less marked, the animal approaches the vegetable-eater in its habits, finally passing over wholly into that class; the incisors and molars being at the same

time proportionably more developed. The entire class is divided, dietetically, into land and sea Carnivora.

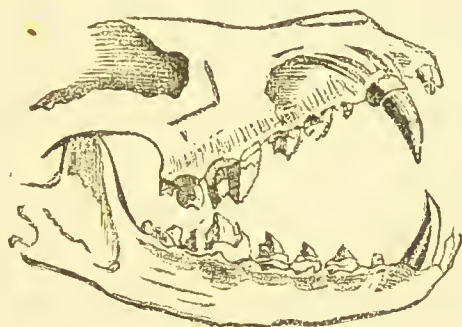


Fig 4.—TEETH OF THE WOLF (Carnivorous).

The carnivorous character is most marked in the feline species, in which the incisors, six in each jaw, are small and undeveloped. The canine tooth is so strongly developed that it appears like a projection of the jaw-bone. The three molars are very sharp, and capped with three points. The motion of the jaw in mastication is only vertical; in striking contrast with the lateral motion of the Ruminants. In accordance with the form of their teeth, cats prey upon warm-blooded animals. Their salivary glands are very imperfectly developed.

In the dog family the form of the teeth is somewhat different. The canine teeth no

longer play a chief part, nor reach so great a size. On the contrary, the number of molar teeth is increased, and their development is more perfect, which circumstance indicates increased mastication. Accordingly many species of this family, especially the hyena, live wholly upon carrion.

In the bear family these characteristics are still more prominent. The canine teeth are less and the molars and incisors more developed, the latter having a flat but roughened crown. All this indicates a still nearer approach to a vegetable and fruit diet, as is actually the case. The bear, as is well known, is fond of berries, fruits of all kinds, milk and honey.

The Insectivora.—The Insectivora, or insect-eaters, are more nearly related to the Rodentia than to the Carnivora. The form of teeth varies with the species. The incisors and canines are not especially prominent, but the molars are always serrated with numerous small-pointed eminences, or cusps, adapted to crushing insects. The three leading families of the Insectivora are the moles, the shrew mice, and the hedgehogs. They are of small size,

and are found in all countries, except in South America and Australia. Although, as we shall see later, we have a more certain and scientific foundation for determining the dietetic and zoological rank of an animal in its origin and character than by comparative



Fig. 5.—TEETH OF THE SHREW-MOUSE
(Insectivorous).

anatomy, yet we may derive dietetic conclusions from the structure of the teeth, as compared with those of man, and these may be substantiated by a comparative study of the other organs.

Figure 6 shows the omnivorous teeth of the swine, the canines having an extraordinary

development, and being used as instruments of attack and defense.



Fig. 6.—TEETH OF THE SWINE (Omnivorous).

The Teeth of Man.—Let us now consider the human teeth. Their most striking peculiarity is their perfect articulation: the opposing teeth of each jaw meeting uniformly, and leaving no interval in the under jaw, opposite the canines, as is the case with the anthropoids. In their perfect and complete state, there are thirty-two teeth, sixteen in each jaw; viz., four incisors, two cuspids or canine teeth, four bicuspid, and six molars. The incisors have a broad, chisel-shaped body, with a slightly serrated, cutting edge. The cuspids are round and strong, with a long, tapering root. The bicuspid, or false molars, have a rounded body, terminating on its grinding edge in two points, with a rough groove

between them. The molars are placed behind all the other teeth. The crown has a squared or cuboid form, with four points on the masticating surface, separated by channeled depressions.

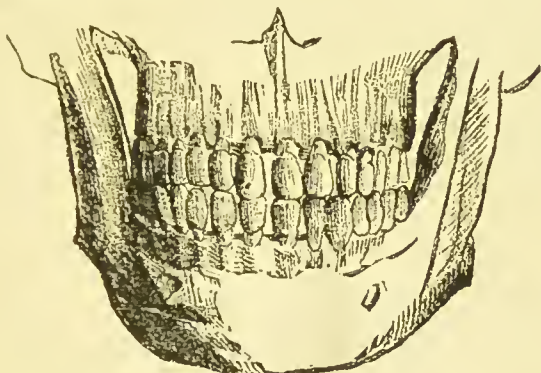


Fig. 7.—TEETH OF MAN (Frugivorous). Front view.

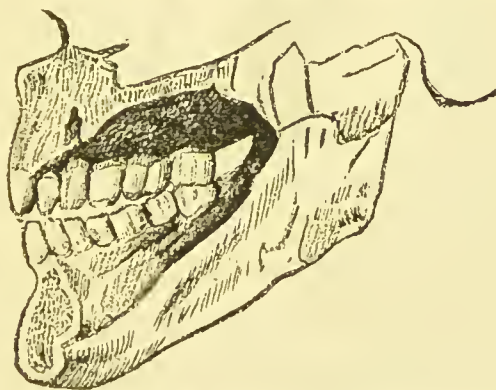


Fig. 8.—TEETH OF MAN. Side view.

A Comparison of Man's Teeth with those of other Animals.—If now we compare the human teeth with those of the

chief representatives of the various dietetic species, with reference to the peculiarities above named—as, the size and kind of teeth, their relative length, strength, intervening spaces, etc.—we shall find not only the greatest similarity, but, at least with reference to number and kind, a complete accordance between the human teeth and those of the anthropoid apes. The complete absence of

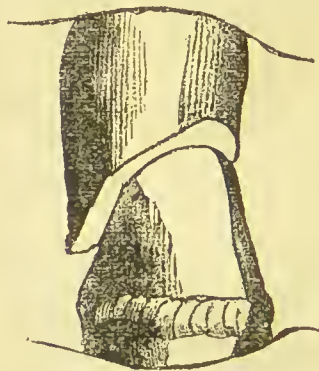


Fig. 9.—EYE-TEETH OF AN OLD GORILLA.
Natural size.

intervening spaces between the human teeth characterizes man as the highest and purest example of the frugivorous animal. The eye-teeth of the gorilla have often been referred to as evidence that this animal does not strictly belong to the Frugivora, but the most careful observation has substantiated the

theoretical view which has here been presented, and has satisfactorily shown that not only the gorilla, but also the orang and chimpanzee, in a state of freedom, subsist exclusively upon fruits and grains, except perhaps when driven by hunger to a temporary resort to other and less preferred foods.

The eye-teeth of the anthropoid apes are of a totally different character from the canine teeth of the Carnivora. The former are small and stout, and somewhat triangular, while the latter are long, round and slender.



Fig. 10.—EYE-TOOTH
OF A YOUNG GO-
RILLA. Natural
size.



Fig. 11. — EYE-
TOOTH OF MAN.
Natural size.

It is a noteworthy fact that the Anthropoid eye-tooth is rough and cartilaginous at the point of contact between the external tooth and the gum, while that of the Carnivora at the same point is smooth and sharp. The eye-teeth of the Anthropoids is adapted for

use in cracking nuts and the like, while those of the Carnivora are exclusively employed in seizing and tearing flesh. This view of the true nature of these teeth is confirmed by Professor Nicholson, a high authority, and not an advocate of the other theories here presented.



Fig. 12.—CANINE OR EYE-TEETH OF THE TIGER.
Natural size.

In his "Manual of Zoology," pages 604–5, he says of the anthropoid apes: "The canine teeth of the males are long, strong and pointed, but this is not the case with the females. The structure, therefore, of the canine teeth is to be regarded in the light

of a sexual peculiarity, and not as having any connection with the nature of the food." The teeth of man are inferior in strength to those of the anthropoid apes, but the cause of this is to be sought not so much in their original character as in the fact that they have been weakened and degenerated by the use of cooked food for thousands of years.

Professor Huxley remarks, with regard to the eye-teeth of the gorilla: "The great development of the eye-teeth of the adult might seem to indicate a flesh diet, but the animal possesses no other characteristic of the *carnivora*." Its extremities end in hands, which are admirably adapted to plucking fruit from trees, and in feet, for the falsely so-called hands of his posterior extremities are in reality feet, as well with reference to the systematic arrangement of the bones as of the muscles. Its gait is nearly, and with some individuals entirely, upright; and the tail-like prolongation of the spinal column, which is peculiar to all other animals of the *mammalia*, is entirely wanting. The nearly upright gait and the strongly developed legs constitute another point of resemblance in structure and

motion between man and the anthropoid apes. The latter, including the chimpanzee, gorilla, orang, and gibbon, in common with man, have the nasal openings directed downward, and divided by a narrow septum, and the eyes looking directly forward. Another physical characteristic of man and the higher apes, which ranks them both as belonging to the Frugivora, is the position of the milk glands upon the breast, while all other mammalia, whether flesh or vegetable feeders, have the so-called teats upon the belly.

Another characteristic in the form of the extremities peculiar to the Frugivora is that of the flat nails. An essential difference is also to be remarked between the tongue of the Carnivora upon the one hand, and of the fruit and vegetable-eaters on the other. The former is rough and made prickly by the presence of horny papillæ, thus rendering it a most efficient rasp in licking the flesh from the bones of its prey, while that of the latter is smooth, and the papillæ quite soft. Since the genuine anthropoids have no tail, and no callosities, in distinction from the related Platyrrhina, and possess, indeed, no

anatomical characteristics different from man, we are compelled to regard the two as belonging in a dietetic as well as zoological sense to the same class.

We have thus been led to the conclusion that, considered from a purely anatomical standpoint, man is neither a flesh nor a vegetable eater, but that his proper food is fruits and grains. A further and striking characteristic of the Frugivora is that they do not take their food directly with the mouth, but possess a limb adapted to the work of plucking it and conveying it to the mouth. This in the case of man and the ape is the arm with its hand.

Peculiarities of Internal Structure.—Besides these striking external points of resemblance, there are many others relating to the interior structure. The skeleton, especially the skull and pelvis, the entire digestive apparatus, and the physiological process of nutrition, all point to a common diet. The cell-material of fruits and grains, and especially of plants, requires a longer time for digestion than that of flesh, and accordingly the stomach and intestinal canal of the plant and fruit eaters

are considerably larger and longer than those of the flesh-eaters; the colon especially being arranged in folds so as to present a great amount of interior digestive surface, while the same organ is smooth in the Carnivora.



Fig. 13.—STOMACH OF THE HYENA (Carnivorous).

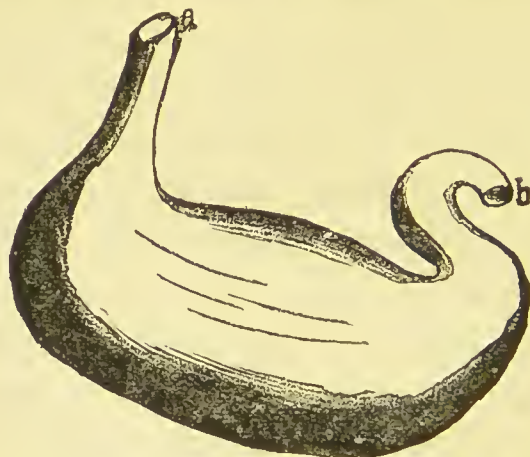


Fig. 14.—STOMACH OF A LION (Carnivorous).

a. Æsophagus.

b. Beginning of small intestines.

The position and form of the stomach are also of significance. In the Carnivora it is only

a small roundish sack, exceedingly simple in structure, while in the vegetable feeders it is oblong, lies transversely across the abdomen, and is more or less complicated with ring-like convolutions, according to the nature of the food.

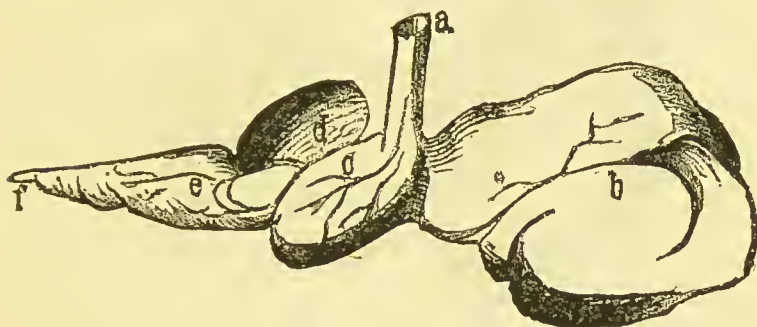


Fig. 15.—STOMACH OF A SHEEP (Herbivorous).

- a.* Œsophagus.
- b.* First stomach.
- c.* Second stomach.
- d.* Third stomach.
- e.* Fourth stomach.
- f.* Passage into small intestines.

This appears conspicuously in the Primates, which include man, in the Rodentia, Edentata, Marsupials, and, above all, in the Ruminants. In the latter it presents a series of from four to seven wide adjoining and communicating sacks.

The intestine of the lion is three times, and that of man and the orang nearly twelve times,

the length of the trunk. In the sheep it is twenty-five times this length, since the grasses upon which it feeds require much more time

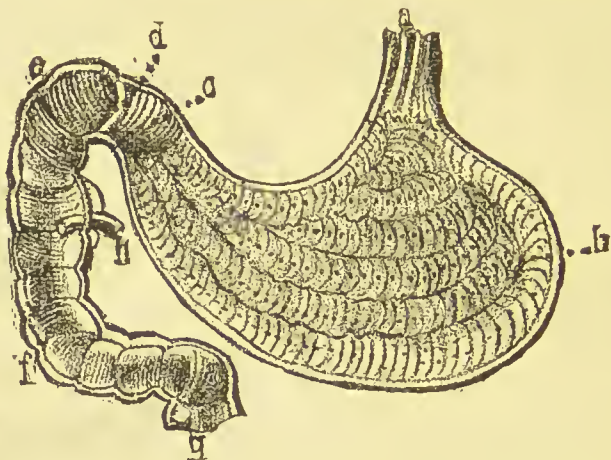


Fig. 16.—STOMACH OF MAN AND THE ANTHROPOIDS
(Frugivorous).

- a.* Œsophagus.
- b.* Cul-de-sac, or fundus.
- c.* Pyloric orifice.
- d.* Pyloric valve.
- e f g.* Duodenum.
- h.* Gall duct.

for digestion than even the grains and fruits on which man feeds. A marked peculiarity of all the carnivorous mammalia is that the skin possesses no sweat glands, while that of the Herbivora and Frugivora is abundantly supplied with them, the number amounting in the case of man to over seven millions. The cause of this difference lies in the fact that

the chiefly nitrogenous flesh-food does not require so high a degree of heat radiation and perspiration as does the more carbonaceous fruit and vegetable food. The Carnivora perspire, therefore, only through the lungs, and hence their great aversion to going into water, since the water causes no activity of the blood in the skin.

MAN'S PLACE IN NATURE.

Concerning man's true place in nature, Hæckel says: "Whatever part of the body we consider we find, upon the most exact examination, that man is more nearly related to the highest apes (pure Frugivora) than are the latter to the lowest apes. It would therefore be wholly forced and unnatural to regard man in the zoological system as constituting a distinct order, and thus to separate him from the true ape. Rather is the scientific zoologist compelled, whether it is agreeable to him or not, to rank man within the order of the true ape (Simiæ)."

To whatever minutiae of detail the comparison is carried, we reach in every case the same result. Between man and the anthropoid

apes there are the closest anatomical and physiological resemblances. In form and function, there is the most exact agreement between all the corresponding bones of the skeleton of each; the same arrangement and structure of the muscles, nerves and entire viscera, and of the spleen, liver and lungs—the latter being a matter of especial significance, for between the manner of breathing and the process of nutrition there is the closest relation.

The brain, also, is subject to the same laws of development, and differs only with regard to size. The minute structure of the skin, nails, and even the hair, is identical in character. Although man has lost the greater part of his hairy covering, as Darwin thinks in consequence of sexual selection, yet the rudimentary hairs upon the body correspond, in many respects, to those of the anthropoids. The formation of the beard is the same in both cases; while the face and ears remain bare. Anthropoids and men become grey-haired in old age. But the most remarkable circumstance is that, upon the upper arm, the hairs are, in both cases, directed downward, and upon the lower arm upward; while in the case of the half apes

it is different, and not as soft as that of man and the anthropoids.

The eye, on account of its delicate structure, is peculiarly suitable for comparisons of this kind; and we find here the greatest similarity; even inflammation and green cataract occur, under the same circumstances, in both. See, also, Darwin upon this point.

There is no more striking proof that man and the anthropoid apes have the same anatomical and physiological nature, and require the same food, than the similarity of their blood. Under the microscope the blood corpuscles are identical in form and appearance; while those of the Carnivora are clearly different from them.

It may now be interesting, in confirmation of what has been said, to refer to the family life, and, if one may so speak, to the mental and moral life of the anthropoids. Like man, the ape provides with exceeding care for its young, so that its parental affection has become proverbial. Connubial fidelity is a general and well-known virtue. The mother ape leads its young to the water, and washes its face and hands in spite of its crying. Wounds are also

washed out with water. The ape, when in distress, will weep like a human being, and in a manner that is said to be very affecting. Young apes manifest the same tendencies as human children. When domesticated they are, in youth, docile and teachable, and also, at times, like all children, disobedient. In old age they often become morose and capricious. Most apes construct huts, or, at least, roofs, as a protection from the weather, and sleep in a kind of bed. One peculiarity is alone common to them and man, and this is the habit of lying upon the back in sleep. In battle they defend themselves with their fists and long sticks; and, under otherwise like circumstances, they manifest like passions and emotions with man: as joy and sorrow, pain and envy, revenge and sympathy. In death, especially, the ape face assumes a peculiarly human-like and spiritual expression, and the sufferer is the object of as genuine compassion as exists in the case of man. It is also well known that apes bury their dead, laying the body in a secluded spot, and covering it with leaves. Regarding the domestic life of the ape, Darwin says, in his "*Descent of Man*" (Vol. 1, p. 39):

“We see maternal affection manifested in the most trifling details. Thus Rengger observed an American monkey (a *Cebus*) carefully driving away the flies which plagued her infant, and Duvaneel saw a *Hylobates* washing the faces of her young ones in a stream. So intense is the grief of female monkeys for the loss of their young, that it invariably caused the death of certain kinds, kept under confinement by Brehm in North Africa. Orphan monkeys were always adopted, and carefully guarded by other monkeys, both males and females. One female baboon had so capacious a heart, that she not only adopted young monkeys of other species, but stole young dogs and cats, which she continually carried about with her. Her kindness did not go so far, however, as to share her food with her adopted offspring; at which Brehm was surprised, as his monkeys divided everything quite fairly with their own young ones. An adopted kitten scratched the above-mentioned affectionate baboon, who certainly had a fine intellect, for she was much astonished at being scratched, and immediately examined

the kitten's feet, and without more ado bit off the claws."

The number of characteristics possessed in common by man and the higher apes is, indeed, very great, and includes not only physical and emotional, but even intellectual, qualities. Those already enumerated may suffice for our present purpose. It is important, however, to notice the fact that the ape, while subsisting exclusively upon fruit and grain foods, develops extraordinary physical strength.

The Gorilla.—The gorilla, which is now regarded as the most human-like of the anthropoid apes, is an enormously strong and ferocious animal. Standing erect he is but five feet high, and yet is able to encounter at once six strong men, and to overcome them by his superior strength and agility. From the earliest times, apes have often, by some writers, been classed as a species of men. In Carthaginian history, a wild race is described which is now believed to have been either the gorilla or some other species of ape.

Effects of Flesh Foods and Intoxicating Drinks upon the Anthropoid Apes.—Although the anthropoids in their natural state

subsist solely upon fruit and grain foods, they can nevertheless be accustomed to a mixed or flesh diet; and exactly here appear their human-like characteristics, for the effect of such food upon them is the same as in the case of man.

A fatty diet causes eruptions upon the face, neck and back. Most apes in captivity die of consumption, like a great part of the population of cities, while carnivorous animals are entirely exempt from it. Apes have coughs and colds under the same circumstances as men. Small pox and other contagious diseases also run the same course with them, and medicines and other artificial stimulants have the same effect. Darwin, in his "*Descent of Man*," gives numerous interesting facts confirmatory of these statements, and with regard to stimulants says:

"Many kinds of monkeys have a strong taste for tea, coffee and spirituous liquors; they will also, as I have myself seen, smoke tobacco with pleasure. Brehm asserts that the natives of northeastern Africa catch the wild baboons by exposing vessels with strong beer, on which they are made drunk. He has seen

some of these animals, which he kept in confinement, in this state; and he gives a laughable account of their behavior and strange grimaces. On the following morning, they were very cross and dismal; they held their aching heads with both hands, and wore a most pitiable expression; when beer or wine was offered them, they turned away with disgust, but relished the juice of lemons. An American monkey, an *Ateles*, after getting drunk on brandy, would never touch it again, and thus was wiser than many men. These trifling facts prove how similar the nerves of taste must be in monkeys and man, and how similarly their whole nervous system is affected."

Such conclusions, derived by the learned from the facts of the case, and with no direct reference to the question of diet, are certainly of great importance to our present discussion. Had these investigators gone a step further, and explained the bearing of their conclusions upon the subject of human food, they must have remarked that the difference between the natural food of the lower order of monkeys and of the gorilla is greater than that between the food of the gorilla and man. Huxley,

indeed, explicitly points out this difference as to the anatomical structure, and might well have drawn the logical conclusion that the same analogy would exist with regard to food. He says: "Whatever part of the animal structure, whatever series of muscles or viscera, we select, as a basis of comparison, the result is the same. The lower monkeys and the gorilla differ more widely than do the gorilla and man."

This conclusion, which we have drawn from anatomy and natural history, that man, judged by his physical structure, is by nature a fruit and grain eater, is confirmed by a further study of his development, both as an individual and as a race; and we will now consider this branch of our subject in the following order:

1. The Individual Life.

- a. Fetal Life.

- b. Post-fetal Life.

2. The Life of the Race.

We have first to study the prenatal life of the individual, especially with regard to the method of nourishment. This process is effected by means of the *placenta*, a soft, roundish,

and vascular organ by which the principal connection is maintained between the parent and the fetus. The form of this organ is of much importance with regard to the classification of placental animals, to which all the mammalia belong with the exception of the Monotremata (the lowest order of mammalia) and the Marsupials.*

MAN'S PAST HISTORY ON THE GLOBE.

In order to fully understand the nature of man as a fruit and grain eater, as indicated by the placental structure, we must make the following preliminary study :

The past history of animal life upon the earth is recorded in the rocks that form its superficial crust. These contain the petrified remains of animal and vegetable substances deposited during successive ages, and the nature of these remains in any particular strata shows

* The importance of the *placenta* with reference to a scientific classification of animals is recognized by all modern naturalists. Professor Huxley, in his "Introduction to the Classification of Animals," Chapter V, treats it at considerable length, and illustrates its various forms by engravings, which may be advantageously consulted by the reader.—*Translator.*

us what animals and plants were living at the time these rocks were formed. These successive periods of life have been designated as the Paleozoic, or Ancient-life period; the Mesozoic, or Middle-life period; and the Kainozoic, or New-life period. To the rocks formed during these periods, and containing fossil remains of the animals then existing, have been applied corresponding terms. They are also called primary, secondary, and tertiary rocks.

The oldest fossil remains of vertebrate animals which we possess are of the fishes of the paleozoic or primary rocks. In these rocks are found also remains of amphibious animals, and in the mesozoic or secondary rocks appear, for the first time, remains of the higher vertebræ, namely, of reptiles, birds and mammals. Only in the tertiary rocks—that is, in the highest and latest formations—do we find the remains of the more highly organized or placental mammalia, to which class man belongs.

The Embryo.—The human embryo, like that of all other mammalia, consists, in the first stage of its development, of a germ and a surrounding yolk, the whole being inclosed

by a thick smooth skin, called the chorion. The chorion itself is covered, upon its external surface, with numerous slender thread-like processes or villi, which project from it into the vascular tissue of the placenta. In this manner, throughout its prolonged intra-uterine life, the fetus is both nourished and relieved of its effete products.

The Placental Peculiarities of Different Animals.—We have now to consider the peculiar structure, form and size of the placenta, as well as the exact method by which through it, in different species of animals, the nourishment is effected. One of the most striking differences presented in placental animals relates to the method of union between the mother and the fetus. There are two very distinct types of the placenta, and, according to Professor Huxley, no transitional forms between them are known to exist. These types are designated as follows:

1. The non-deciduate placenta of the Herbivora.

2. The deciduate placenta, of which there are two kinds :

- a. The zonary deciduate placenta of the Carnivora.
- b. The discoidal deciduate placenta of the Frugivora.

The deciduate placenta is a distinct structure, developed from the wall of the uterus, but separated from it at parturition, and constituting what is known as the “after-birth”; of this the human placenta is regarded by Huxley as the most perfect example; while, of the non-deciduate placenta, that of the pig and horse are the typical representatives. The word *decidua* signifies that which is thrown off.

The Non-Deciduate Placenta.—This form is thus described by Professor Huxley: “No decidua is developed. The elevations and depressions of the unimpregnated uterus simply acquire a greater size and vascularity during pregnancy, and cohere closely with the chorionic villi, which do not become restricted to one spot, but are developed from all parts of the chorion, except at its poles, and remain persistent in the broad zone thus formed throughout fetal life. The cohesion of the fetal and maternal placenta, however, is over-

come by slight maceration ; and at parturition the fetal villi are simply drawn out, like fingers from a glove, no vascular substance of the mother being thrown off." To this

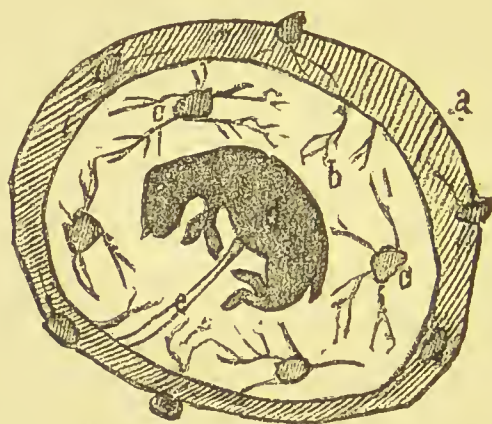


Fig. 17.—IDEAL SECTION OF THE NON-DECIDUATE PLACENTA OF THE HERBIVORA.

- a. Uterine surface.
- b. Fetal surface.
- c. Chorionic villi.
- d. Herbivorous embryo.
- e. Navel cord.

class belong all the Ruminants and Ungulata (hoofed quadrupeds), the camel, sheep, goat and deer; the ant-eater, armadillo, sloth, swine, tapir, rhinoceros, river-horse, sea-cow, whale, and others.

The Zonary Deciduate Placenta.—A zonary placenta surrounds the chorion, in the

form of a broad zone, leaving the poles free. This form characterizes all the land and sea Carnivora, and thus includes the cat, hyena, puma, leopard, tiger, lion, fox and wolf; the dog and bear, the seal, sea-otter and walrus. It includes, also, certain extinct species, as the

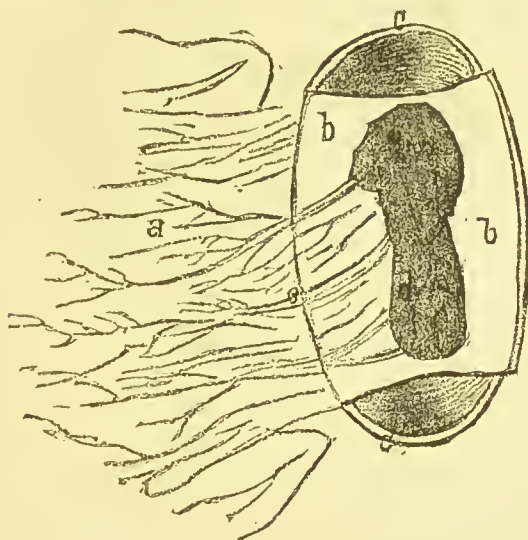


Fig. 18.—IDEAL SECTION OF THE ZONARY DECIDUATE PLACENTA OF THE CARNIVORA.

- a. b.* Chorionic villi, forming placenta.
- c.* Free part of chorion.
- d.* Carnivorous embryo.
- e.* Navel cord.

mastadon and dinotherium, which, although not wholly carnivorous, were, to judge from their teeth, partially so. The elephant, the only

living species of these ancient animals, is also of this class.

The Discoidal Deciduate Placenta.—The

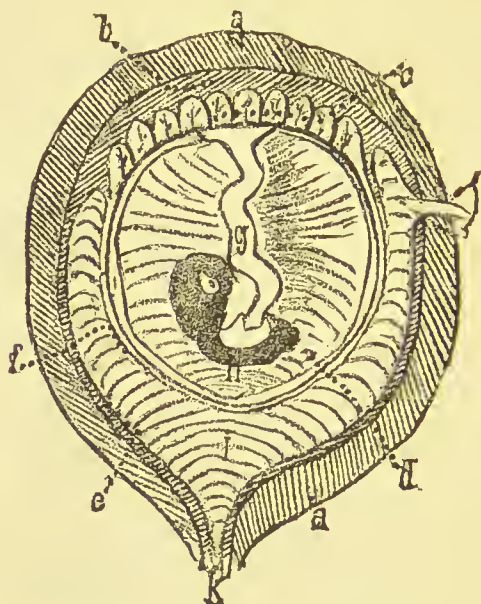


Fig. 19.—IDEAL SECTION OF THE DISCOIDAL DECIDUATE PLACENTA OF THE FRUGIVORA.

- a. Uterus.
- b. c. Chorionic villi, forming the placenta.
- d. Chorion. e. Decidua vera.
- f. Decidua reflexa. g. Navel cord.
- h. Frugivorous embryo.
- i. Uterine cavity.
- k. Lower orifice of uterus.

discoidal placenta is a highly developed vascular structure, lying upon one side of the fetus, in the form of a round disc, leaving

the greater part of the chorion free. It is thus united only upon one side, at one circular point with the mucus membrane of the uterus, from which, as already mentioned, it is separated at parturition. The orders of animals characterized by this form of placenta are the Rodentia, ant-eaters, bats, the various species of apes, and man. All these are very closely united by homologous anatomical forms. The human placenta does not differ, in its general character, from that of the others, and there is no good reason for separating man from this placental classification.

Relations between Placental Forms and Individual Characteristics.—From our entire knowledge of the development of races and of individuals, we may conclude, upon the basis of Huxley's classification, that an intimate relation exists between the form and character of the placenta and the entire nature of the individual. We find among the non-deciduata, besides the toothless sloths, only the Ungulata, or hoofed quadrupeds, and others developed from them. The arrangement of their teeth, as of their entire digestive apparatus, marks them

as belonging to a single family, namely, the Herbivora.

The zonary placenta characterizes a very large family of animals, whose peculiarities are distinctly marked, especially with regard to their teeth and digestive apparatus. These belong to the widely diffused and numerous order of the Carnivora. But the most interesting and important group, with reference to our present study, is that characterized by the discoidal placenta; for, since it includes man and the fruit-eating apes, it gives occasion for a comparison between these and the other placental animals from the standpoint of dietetics.

We observe here at once that the majority of animals having a discoidal placenta subsist chiefly upon fruits and grains, and that the typical representatives of this class, namely, those whose placental formation is most distinctly discoidal, are also the most exclusively frugivorous.

Here, as elsewhere in nature, an exact line cannot be drawn. Transitional forms exist everywhere, and to this the placenta is no exception. The most striking accordance, however, exists between the placenta of man and that

of the tailless apes, namely, the gorilla, orang, chimpanzee and gibbon. Between other discoidal species, the differentiation though minute is clearly marked, but between man and these apes the resemblance is so exact as to stamp them plainly as members of the same family.

The completely developed placenta is in the form of a circular disc, about eight inches broad, one inch thick, and weighing about two pounds. Its manner of development is identical in the human subject and that of the above-named anthropoid apes. Its exact formation is thus described by Huxley :

“From the commencement of gestation, the superficial substance of the mucus membrane of the human uterus undergoes a rapid growth and textural modification, becoming converted into the so-called decidua. While the ovum is yet small, this decidua is separable into three portions: the *decidua vera*, which lines the general cavity of the uterus; the *decidua reflexa*, which immediately invests the ovum; and the *decidua serotina*, a layer of especial thickness, developed in contiguity with those chorionic villi which persist and become converted into the fetal placenta. The *decidua*

reflexa may be regarded as an outgrowth of the *decidua vera*; the *decidua serotina* as a special development of a part of the *decidua vera*. At first, the villi of the chorion are loosely implanted into corresponding depressions of the decidua; but, eventually, the chorionic part of the placenta becomes closely united with and bound to the uterine decidua, so that the fetal and maternal structures form one inseparable mass."

The fetus thus united to the mother is nourished by means of numerous arterial and venous trunks, which traverse the deeper substance of the uterine mucus membrane, in the region of the placenta. These are connected with the placenta by means of the umbilical cord, which consists of two arteries and two veins. The length of this cord is greater in the case of man and the anthropoid apes than in any other animals, reaching in them a length of about two feet. The strict accordance which thus appears between the placental structure of man and the ape indicates, upon the basis of Huxley's principles of classification, the same physiological functions and the same dietetic character. There exists a complete

similarity between the corresponding organs in each: Their extremities end in hands and feet. Their teeth and digestive apparatus indicate a frugivorous diet. Their breasts and manner of nursing suggest the same tender care of the new-born creature; while the brain and mental capacity are also of a like character, differing only in degree; indeed, the difference between the ape and animals of the next lower grade is much greater than between the ape and man, there being in the latter case really no essential anatomical or physiological differences.

Dietetic Conclusions.—Hitherto man has seemed to occupy an exceptional position in nature, and this view has led to erroneous theories of diet; but these theories are corrected by the recognition of his true position, as belonging to the family of the tailless apes, of the order Simæ, and to the class of animals having a discoidal placenta. We know now with certainty that the anthropoid apes, in their natural state, live only upon fruit and grain. They eat figs, apples, corn, bread-fruit, bananas, nuts, etc. The lower orders of monkeys are, indeed, somewhat inclined to

eat flesh, but this is not their preferred food, while those nearest related to man consume vegetable food exclusively. It is true that even the higher apes may be trained to a flesh diet, but this fact is of no importance, since in like manner the Carnivora may be accustomed to a vegetable diet. It is true, however, that the apes kept in zoological gardens, and trained to eat flesh, die rapidly with scrofulous affections and consumption: diseases caused directly by that corruption of the blood which results from an unnatural change of diet. We shall call attention later to similar conditions in the human system.

The natural food of the ape is, as we have seen, uncooked fruit and grain, and, reasoning from analogy, we are justified in asserting that this is also the proper food of man. In reaching this conclusion we have not been guided by the external characteristics of animal life—the mere outward resemblances—upon the basis of which the old school of naturalists constructed their systems, but have endeavored to make a comprehensive study of the entire organism. We have given

especial attention to the theory of descent, since all true relationship must result from the fact of a common origin.

In giving such great prominence to the facts of placental structure, as a basis of classification, we are justified by the best naturalists of the present day. We have accepted, without modification, the classification proposed by Professor Huxley, and have simply extended its application in the direction of our present study. At the conclusion of his systematic presentation of the subject, in his "Introduction to the Classification of Animals," Professor Huxley says: "But, admitting all these difficulties and gaps in our information, it appears to me that the features of the placenta afford by far the best characters which have yet been proposed for classifying the Monodelphous *Mammalia*, especially if the concomitant modifications of the other fetal appendages, such as the allantois and yolk-sac, be taken into account."

Harmony between Man's Structure and his Food.—In the placental structure is involved the history of the development both of the race and of the individual; and, since

the placenta is the organ through which the nutrition of the fetus is effected, it is of necessity the direct expression of the dietetic character of the fetus. This appears at a very early period of fetal life, and becomes more and more marked in the successive periods of development. We see here in a peculiar form the operation of the general law of nature, namely, that every species and every individual is nourished in accordance with its physiological character. There is the strictest accordance between the capacity for nourishment, the food, and the natural impulses leading to its acquirement, on the one hand, and the anatomical structure, on the other. The conformation of the skull, teeth, hands and feet, tongue, stomach, and entire digestive apparatus, exhibit this adaptation.

With regard to the form of the extremities, there are three marked types in the animal kingdom, namely, the hoof, the claw, and the hand. With regard to embryonic characters, we have the non-deciduate, the zonary, and the discoidal placenta; and with regard to diet, the orders of the Herbivora, the Carnivora and the Frugivora. Professor Huxley

has investigated this subject from an entirely different standpoint than that of dietetics, yet he arrives at the same conclusions concerning man's place in nature. He says: "The most superficial study would at once convince us that, among the orders of placental mammals, neither the whale nor the hoofed creatures, nor the sloths and ant-eaters, nor the carnivorous cats, dogs, and bears, still less the rodent rats and rabbits, or the insectivorous moles and hedgehogs, or the bats, could claim our *Homo* as one of themselves. There would remain, then, but one order for comparison, that of the apes (using the word in its broadest sense), and the question would narrow itself to this, Is man so different from any of the apes that he must form an order for himself; or does he differ less from them than they differ from one another, and hence must take his place in the same order with them?" The answer to this question has already been given.

Stages of Embryonic Life.—It is highly instructive, with reference to our present study, to observe the successive stages of embryonic and fetal life. The original principle of life

is everywhere the same. The embryo destined to develop into a human being cannot be distinguished from one that is to produce a serpent, a fish, or a bird. The embryo of all mammalia, up to a certain point, pass through the same course of development, and the similarities of form in those races most nearly related continue longer than in races not thus related.

The human embryo cannot be distinguished from that of the anthropoid ape until a very late period, while between the ape and other placental animals very great differences are apparent, some time before the conclusion of fetal growth. Only just previous to birth do slight differences appear between the human fetus and that of the anthropoid ape, these relating chiefly to the posterior extremities, which in the one case develop into flat feet, and in the other into foot-like hands. In all other respects the human child, even after birth, bears a striking resemblance to the new-born ape, especially in its small forehead, and imperfectly developed brain. Both come into the world in the same help-

less condition, quite unlike the Carnivora, and demand a like nursing and care.

In not a few cases the new-born child bears an astonishing resemblance to the young ape. The head is disproportionably large, and the eyebrows have an unusual projection; the entire body has a thin covering of brown hair. In some cases children, afterward blonde, have at birth a head of long black hair, which falls out after a few days or weeks, and gives place to a new and more human growth. In all this appears our relation to the frugivorous apes, between which and ourselves there is absolutely no biological or dietetic difference that can be traced, either in the anatomical structure or in the development of the race or the individual.

Besides these evidences of the frugivorous nature of man, derived from his physiological nature, we have a class of facts relating to the form of the skeleton, and especially to the bones of the skull and face, to which both Huxley and Vogt have called attention. The relative prominence of the teeth and jaws is especially to be noted. The facial angle accords with the intellectual and moral grade of the individual.

Instinct and its Impulses.—Let us suppose the case of a man surrounded only by natural influences and prompted only by his unperverted natural instincts. Let him have access to all natural fruits and grains for food, and also have at his service the domestic animals. To such a person the thought of slaying and devouring these animals would never occur. He would find such food as foreign to his nature and wants as the grasses beneath his feet. But every physical instinct, every moral impulse, the sense of beauty and of right, would attract him to the overhanging fruit and to the waving grains as his natural food. In them would he find his highest comfort and satisfaction.

Man a Child of Nature.—In the economy of nature, every animal and plant has an appointed place and work. The interchange of material and the ceaseless transition of form goes on in accordance with wisely ordained and perfectly adapted law. Even though we may deny a purpose in nature itself, and attribute all to a personal and overruling Will, yet we must concede that the general plan acts through those laws the

operation of which we continually witness. Man, too, in this sense, is the child of Nature, and as such his place is not that of the carnivorous devourer. The necessity of killing in self-defense implies no duty or necessity to eat the carcass, either reeking in its blood or disguised by the injurious arts and spices of the kitchen. The immense distance, both physical and moral, that separates us from the ravenous beast of prey, must suggest also an essential difference in the means of subsistence.

The Forest the Original Home of Man.—

The frugivorous nature of man is apparent in the fact of his immediate dependence upon the forest. Every animal has its appointed place. The Herbivora roam the plains, many of the Carnivora seek the desert, the sea has its inhabitants, and myriads burrow in subterranean dwellings, but the forest is the natural home of man. In the city he is an exile. Here his natural powers decay, and ever and anon he must hie away to his native shades for that repose of which an unnatural civilization has robbed him.

Trees afford not only an important part of the food of man, but are his natural pro-

tection. They check the violence of storms, purify the air, and render the climate more equable and the soil more fertile. We are also directly dependent upon them for the necessary rain-fall, and their destruction over so great a portion of the earth has been followed by such injurious consequences that the attention of governments is everywhere being called to it, and already preventive measures have been taken and efforts made to replant districts where they have been unnecessarily destroyed, and to find room for them everywhere by the waysides. Thus does man return, impelled by the instinct of self-preservation, to his natural state. With his grain fields lined by fruit-bearing trees, with the vitalizing sun, and the cooling shade, he may derive from nature all that he needs for the maintenance of his physical and moral life.

Nowhere has civilized man displayed more humanity, or greater simplicity of morals and of unperverted instinct, than in the vicinity of forests. Here have lived the healthiest and longest-lived portion of the human race. The farther the dwelling place is from the forest, the weaker and less courageous are the people.

The destruction of forests and the concentration of people in cities were the chief causes of the decay of the ancient empires. That the enervated Romans fell before the forest-dwelling Germans is a well-known historical fact.

A study of the distribution of plants and animals over the surface of the earth affords us instructive material. The original home of man is also the home of fruits and grains. All of our most nutritious fruits have been acclimated from the south, and with the diffusion of the human race has kept pace also the diffusion of the fruit-tree. The highest civilization is everywhere found in conjunction with it. Where this nourishment is wanting, and the food is limited to flesh, with, perhaps, mosses and other low orders of plants, the human mind is correspondingly weak and ill-developed. In the temperate zone, where fruits are most varied and abundant, the life of man is most developed and prolific. The sense of the beautiful, the basis of the fine arts, is also developed only under the influence of an abundant flora of fruit-bearing trees, and through this does man attain to the ripest products of his earthly life.

The differences between flesh and fruit-eating animals are exhibited in the following table :

TABLE OF COMPARISONS.

<i>The Carnivora.</i>	<i>The Anthropoid Ape.</i>	<i>Man.</i>	<i>The Omnivora.</i>
Zonary Placenta. Four-footed. Have claws. (to on all fours. Have tails. Eyes look sideways. Skin without pores. Slightly developed incisor teeth. Pointed molar teeth. Dental formula : * 5.108.1.6.1.5.108. 5.108.1.6.1.5.108. Small salivary glands. Acid reaction of saliva and urine. Rasping tongue. Teats on abdomen. Stomach simple and roundish. Intestinal canal 3 times length of the body. Colon smooth. Live on flesh.	Discoidal placenta. Two hands and two feet. Flat nails. Walks upright. Without tails. Eyes look forward. Millions of pores. Well-developed incisor teeth. Blunt molar teeth. Dental formula : 5.1.4.1.5. 5.1.4.1.5. Well-developed salivary glands. Alkaline reaction saliva and urine. Smooth tongue. Mammary glands on breast. Stomach with duodenum (as second stomach). Intestinal canal 12 times length of the body. Colon convoluted. Lives on fruit.	Discoidal placenta. Two hands and two feet. Flat nails. Walks upright. Without tails. Eyes look forward. Millions of pores. Well-developed incisor teeth. Blunt molar teeth. Dental formula : 5.1.4.1.5. 5.1.4.1.5. Well-developed salivary glands. Alkaline reaction saliva and urine. Smooth tongue. Mammary glands on breast. Stomach with duodenum (as second stomach). Intestinal canal 12 times length of the body. Colon convoluted. <i>Homo sapiens vegetus</i> — Lives on fruit.	Non-deciduate placenta. Four-footed. Have hoofs. (to on all fours. Have tails. Eyes look sideways. Skin with pores. Very well developed incisor teeth. Molar teeth in folds. Dental formula : 8.1.2.103.1.8. 8.1.2.103.1.8. Well-developed salivary glands. Saliva and urine acid. Smooth tongue. Teats on abdomen. Stomach simple and roundish, large cut-de-sac. Intestinal canal 10 times length of the body. Intestinal canal smooth and convoluted. Live on flesh, carrion and plants.

* In this formula the figures in the center represent the number of incisors ; upon each side are the canines, followed to the right and left by the molars.

Instinct, Morals and Science Harmonize.—

The law thus presented by science is implanted in us also through sentiment and instinct. A newly weaned child, left to its own natural impulses, desires no other food than juicy uncooked fruits, and among cooked foods it prefers the various fruit and farinaeous preparations to all others.

The moral instincts of man may be regarded as a certain form of natural law, and may thus be employed as means of testing his scientific conclusions. In order to this, it is only necessary to submit to our moral sense each of the processes by which our nourishment is provided. A perfect accordance here will go far to justify the system of diet which we may have adopted. So far as our food is provided in harmony with the laws that relate to our own nature and requirements, it must afford us an inward satisfaction, and only when we threaten to violate these laws will an instinctive moral feeling restrain us from such a misuse of our natural powers.

Let us now apply the moral test which we have proposed to the practice of slaying and feeding upon our fellow-creatures, the faithful

animals that surround us and serve us. In proportion to the degree of elevation of these animals in the scale of being must the thoughtful and benevolent mind experience a feeling of repugnance to such a method of nourishing the body. While all who in the least reflect upon the matter must experience in some degree this aversion to the horrors of the slaughter-house, one who has never been accessory to it, but whose instincts remain pure and natural, must regard it with the utmost loathing and aversion.

This instinctive feeling which civilized man has so nearly lost must be elevated through education to its true moral position. Its manifestation is nothing else than the effort to restore the normal conditions of man's nature, and to maintain a proper harmony between his physical and mental habits. In the light of the facts which we have here presented, there can be no further doubt of the frugivorous nature of man, and the only remaining question now is whether he can, by virtue of his intellectual character and of his freedom and culture, deviate from his original nature, and establish new and arbitrary dietetic con-

ditions for himself, without serious injury.

In seeking to answer this question, we are at once confronted with the fact, everywhere apparent, that man is the child of nature, and that his highest wisdom consists not in violating the laws of his being, but in submitting to them and in regulating his entire conduct in accordance with them. When he is thus in harmony with nature, he is indeed able to make its laws and normal processes subservient to his purposes; but when he presumes to assert his superiority to these laws, or when he ignorantly violates them, he appears at once feeble and helpless. Disease and premature death are Nature's penalties for the violation of the physical and moral laws which she has so wisely established.

The same conditions are apparent throughout the entire animate world. A plant flourishes and develops only in a soil and climate which affords it the necessary nourishment and other normal conditions of life, and all animals when deprived of these conditions languish and die out. All plant-eating animals, for example, become diseased when forced to subsist upon flesh. Apes thus fed in captivity die of con-

sumption. Even cooked plant foods destroy the health of cows and swine, and shorten their lives. The same general law holds good in the case of man, whose organization differs in no essential respect from that of other animals; and hence we may well assert that his boasted capacity to accustom himself to any chosen food rests upon self-deception and exaggeration.

Man's Highest Culture.—Man's highest condition of culture appears to be that in which he lives in accordance with physiological laws. The assertion that culture and understanding elevate him above these laws is only the idle boast of a wretched egotism—a boast that makes man only an ape with understanding. Man is not, however, man by virtue of his intellect alone, but through the harmonious development of all his faculties. His position is a moral as well as an intellectual one; the heart, the affections and the sense of moral right must be recognized as well as the intellect.

True culture is essentially nothing else than the effort of man, through his consciousness and insight into nature, to smooth the course of his development, and the same conclusions

which we derive from the evolution of the individual apply also to that of the race. However one may regard the Darwinian theory, it is certain that it contradicts no well-established scientific fact, while it imparts to all the other sciences—to embryology, anthropology, philology, zoology, philosophy, and psychology—a unity that has never before existed, and explains many hitherto unaccountable forces. Darwin gives the following picture of the original form and condition of man: “The early progenitors of man were, no doubt, once covered with hair, both sexes having beards; their ears were pointed, and capable of movement; and their bodies were provided with a tail having the proper muscles. Their limbs and bodies were also acted on by many muscles which now only occasionally reappear, but are present in the *Quadrumana*. The foot, judging from the great toe in the fetus, was then prehensile; and our progenitors, no doubt, were arboreal in their habits.” Again, he says: “At the period and the place, whenever and wherever it may have been, when man lost his hairy covering, he probably inhabited a hot country, and this would have

been favorable to a frugivorous diet, on which, judging from analogy, he subsisted."

Blood Corpuscles of Man, the Ape, and the Carnivora.—An important fact, bearing both upon the development theory and its application to dietetics, has recently appeared. This relates to the similarity between the blood corpuscles of man and the anthropoid apes, and the difference between both and those of the Carnivora. We may, from the character of these corpuscles, draw interesting conclusions with regard both to man's diet and origin.

Man's Nature has not Changed.—It is often asserted by writers, and readily believed by the laity, that man originally lived upon fruits, but that circumstances led him to enlarge his diet by the addition of flesh, to which he is now so thoroughly accustomed that it has become a necessity. Such an application of the theory of natural selection is, however, very questionable. Upon the same principle every injurious habit might be justified. Man might be pronounced a brandy drinker by virtue of long habit, and thus the greatest of modern evils, drunkenness, be

excused, and the theory of development thus be perverted to the subversion of morality, while its true application can only lead to the noblest results.

The essential principle of natural selection lies in the reciprocal action of two physiological functions: the adaptation of the individual to new circumstances, and the transmission of those qualities thus called into existence. The acquirement of new characteristics on the part of the individual depends upon the reciprocal action between the organism and external influences acting upon it, and this process depends greatly upon the chief of all physiological functions, that of nutrition. Nutrition, however, consists not merely in the reception of food, but is closely related to the conditions of climate, soil, air, light, heat and moisture, and to the surrounding vegetable kingdom.

It would, however, be wholly erroneous to suppose that in this process of adaptation, and in the acquirement of new qualities, the organism acts only passively and receptively. On the contrary, every external influence is encountered by a vital force acting from within, and is accepted, rejected, or treated

indifferently, according as it harmonizes, conflicts with, or is indifferent to, the previously existing conditions of the individual. The organism is itself a force, striving for the attainment of a certain end, and eager to transmit itself intact to its posterity.

Adaptation not Always Favorable.—Another important fact in this connection is that the process of adaptation to new conditions does not always result favorably to the individual or to the race. While favorable conditions tend to elevate, unfavorable conditions tend to deteriorate and destroy; and the latter, continued through several generations, may lead to disorganization and extinction. Progress is not therefore an absolute law of nature. New conditions can only be accepted by the organism, and thus enter as elements into its growth, when they stand in a certain relation to it. A natural affinity must exist between the two, though they may possess certain marked differences, but these must act harmoniously and reciprocally. An enforced reception of new qualities or conditions, however good these may be in themselves, is injurious, and must lead to disease and decay.

A striking example of development through the gradual action of natural forces is presented in the record found in the rocks of the earth's crust. The fossil remains here stored up indicate a vast period of life, and of the successive development of species, and the laws thus acting must apply, not only to the vast series of events that have resulted in the existence of man in his present condition, but to this condition itself, and to all the phenomena of our own daily life. With this law of adaptation is associated that of hereditary transmission. Adaptation without transmission is of no permanent or scientific importance. Complete adaptation does not always result in transmission, for there is primarily in every organism a strong tendency to transmit the original fixed characters of the progenitor rather than those newly acquired. This is called conservative transmission. Hæckel says: "The uninterrupted maintenance of the specific characters of a species from generation to generation is the general rule in all the highly developed plants and animals."

Every organism resists each new quality

that is forced upon it in the struggle for existence, unless this new quality tends to make the conditions of life more easy. The effort to resist change is therefore nothing else than the struggle of the organism against those changes that tend to limit its powers. The permanence of an acquired character depends upon its ability to transmit itself to its posterity. In order, however, that a peculiarity may be transmitted, it must first become an integral part of the individual who is to transmit it. This is not the case with the use of flesh-food by man, for the most refined flesh-eater, left entirely to his own nature, is no longer able to subsist upon it, for he is not able to appropriate and prepare it, and still less is he able to transmit to posterity a faculty which he does not possess.

Essential Conditions of Natural Adaptation.—It is indispensably necessary to natural adaptation that between the forces of nature and the living organism there should intervene no artificial agency. While this is true with regard to adaptation, it is peculiarly true with regard to transmission. Both these are

purely physiological processes, and cannot therefore have an artificial basis. In what is called "artificial propagation" it is not the art of man which generates new forms. The part of man consists in surrounding the object of his care by the most favorable natural conditions. These, freely acting, generate new qualities, which, if surrounded by the conditions under which they were produced, are transmitted to posterity. This requisite of immediate contact does not exist between man and the flesh food to which he seeks to adapt himself. No man is able to enter into direct physiological relations with a living animal as food. In order to accomplish this he must, with the aid only of his natural faculties, kill and devour the animal. But, if between the animal and the man the work of the butcher and of the cook must intervene, natural adaptation is excluded, for these intermediate agencies render the process unnatural; and, since they cannot be acquired or transmitted as individual traits, they invalidate whatever seeming adaptation may be associated with them. Only the elements of nature can be allowed to enter into the process. Every artificial preparation

of flesh weakens the natural functions and impairs nutrition. The diseases associated with flesh-foods show that their tendency is not toward a higher development, but that they tend to deterioration and decay.

A further condition of natural adaptation is that the offspring should be capable of complete adaptation to the acquired characteristic; that it should be to them *natural* and in harmony with all their wants and instincts. These conditions are not realized in the case of a flesh diet. Weaned children do not at once and of their own free-will partake of it. On the contrary, they have to be accustomed to it by degrees, and it is often necessary to resort to artifice to induce them to eat it. And when accepted by them, its injurious effects become apparent by eruptions upon the skin, and by other affections, all indicating that a poisonous agent has been introduced into the system.

The conditions requisite to complete adaptation and transmission may be summed up as follows:

1. The object to be adapted must be received in its natural state. It must not

be of a nature to require artificial preparation.

2. The receptive organism must enter into immediate contact with the object, which must be in harmony with the previous conditions of life.

3. The assimilated object must generate no disease.

4. In order that a quality acquired by adaptation may be transmitted by inheritance, it must first become an integral part of the parent organism.

If we now subject the use of flesh as food to the test of these conditions, we find that it meets no one of them. Its behavior toward the system is in the nature of a poison, and is therefore directly antagonistic to natural selection.

Only a superficial acquaintance with the laws of natural selection can lead to the opinion that the accustoming one's self to any chosen food can result in genuine adaptation. It is plain that different articles of food exert a different influence upon the human system; and it has not been, and cannot be, shown that man has, through any normal or physiological process, been developed into a true flesh-

eater. However widely the various races of men differ, they are united in the fact of being, when under conditions promotive of their highest welfare, frugivorous. Neither the cannibalism of the New Zealand Maori during hundreds of years, the strange clay food of certain South American Indians, nor the train oil and blubber upon which the dwarfish Eskimos subsist, have been able to produce such changes in the human system as to conceal from the anatomist the frugivorous organization of man. These, like other races, show in their entire structure—in the teeth, in the smooth tongue, the stomach and intestines, the form of the hands and feet, only the characteristics of the fruit and grain eater. The consumption of flesh for thousands of years may indeed have given to man certain carnivorous characteristics, but his anatomical structure and physiological functions remain unchanged. In order to effect such a transformation in these as should convert man into a carnivorous animal, something very different would be required from anything that has as yet occurred in his experience.

If, for example, vegetable foods should en-

tirely fail, and man should be compelled to secure his food by lying in wait for and devouring wild animals, he might in the course of generations develop a carnivorous nature. His teeth might come to resemble those of the tiger, his hands might be transformed into claws, and his appetite for blood become strictly normal. This would accord with the laws of natural selection; but while no such process occurs—while man retains all the physical characteristics of a frugivorous animal—we are justified in pronouncing him to be in reality such, and in regarding his present habit of flesh-eating as abnormal and antagonistic to the principles of natural adaptation. And, since the human race constitutes but a single species, we are justified in drawing general dietetic conclusions, applicable to man everywhere. Differences of anatomical structure such as would rank one human family among the Carnivora, and another among the Frugivora, would indicate a variation far exceeding the proper limits to which a single species are confined.

The Relation of Food to Social Conditions.—A glance at human history—at what

we may call comparative history—will exhibit the moral and social bearings of this question. Carnivorous men, like carnivorous animals, are disposed to a roaming, savage and warlike life; while frugivorous men, like frugivorous animals, tend to much closer social relations: gathering in communities and waging war, rather in self-defense, or with a moral purpose, than for the love of carnage. Agricultural races have ever been least inclined to strife, but the bravest and most steadfast in defense of right. The wild Indian, thirsting for blood, vanishes before the peaceful settler who, in defense of home and community, engages in war only that the peace and quiet which he loves may be permanently secured. Thus the bone and sinew of the conquering German armies have chiefly consisted of the peace-loving peasants who subsist mainly upon man's natural food. So far as these have been led to wars of conquest, they have been stimulated to it by the ambition of the flesh-consuming and corrupt aristocracy which dominates at the great political centers, where such wars are determined upon, and to which the peace-loving

agriculturist is unwillingly led, though his steadfast character is its chief support in the hour of trial.

In the deviation from a frugivorous diet is to be found one of the causes of that physical decay which is so apparent in all great European cities, where a much larger proportion of flesh is consumed than in the country. The population of cities has continually to be replaced by accessions from the more frugivorous inhabitants of the country. It is said that a Parisian family scarcely survives a third generation. Thus, history confirms the deductions which we have drawn from science, and both justify us in asserting that an agricultural life and a vegetable diet constitute the physical basis of individual as of national prosperity, and that through them all natural forces of the human organism are conserved and perpetuated, while, on the contrary, a flesh diet leads to disintegration and decay.

Evidence from Embryology.—Embryology also affords us important evidence bearing upon this subject. The human embryo passes through a succession of stages corresponding

to those of the entire race. In these it approaches more and more nearly to the frugivorous anthropoid ape, and it is therefore unphilosophical to hold that man is normally developed into a flesh-eater. Rather would we expect him to continue the same course upon which, by virtue of his organization, he had once entered. A knowledge of the development of any organism is necessary to a complete acquaintance with its present condition and requirements. The successive stages through which the human embryo and fetus pass correspond to those of the race. At first there is no distinction apparent in the life germs of different animals, including man. Professor Agassiz at one time having neglected to attach a label to a certain embryo in his collection could not tell afterward by the most minute microscopic examination whether it was that of a fish, a bird, or a mammal.

Commencing thus upon a seeming level with all the animals, the human germ passes through successive stages of development, in which it bears a resemblance to higher and higher forms of animal life, terminating with

that of the frugivorous anthropoid ape, in the last stage of fetal life, and being, so to speak, only *born* as a man, for there only do the features that distinctly characterize the human species become fully apparent. It is agreed by all modern naturalists that the development of the individual corresponds to that of the race to which he belongs, and it follows from the facts presented that human development has been progressively toward a vegetable diet. Shall we then assume that, man being developed, his further course is backward toward the Carnivora! Such is the nature of the argument for a flesh diet, when based upon man's capacity of adaptation to new conditions. It certainly seems more philosophical to regard his frugivorous tendencies as normal and proper, and his taste for flesh as something acquired under the pressure of circumstances.

The natural course of development, as man progresses from a savage to a civilized state, is certainly not in the direction of flesh-eating. The ability to kill and devour is of a lower order than the ability to till the soil. The roaming savage subsists by the

chase, and it is the especial care of the Christian missionary to convert him into a peaceful agriculturist, in which condition he becomes more and more a vegetarian; and this is true of the human race in general. The testimony of the Indian chief in "Lorna Doone" is especially in point here: "Do you not see," says he, "that the whites live on corn, but we live on flesh; that the flesh requires thirty moons to grow, and is often scarce; that every one of the wonderful seeds which they scatter on the soil returns them more than one hundred-fold; that the flesh has four legs to run away, and we only two to catch it; that the seeds remain and grow where the white man sows them; that winter, which for us is the season of laborious hunts, is to them a time of rest? It is for these reasons that they live longer than we do. I say, then, to every one who hears me, before the maples of the valley cease to yield us sugar, before the trees above our huts shall have died of age, the race of the sowers of corn will have extirpated the race of flesh-eaters, unless the hunters resolve also to sow."

Transitional Stages of Development.—

Combining all the evidence we possess, and tracing the development of the individual from the first germ of embryonic life, and of the race from its mere brute origin, through all stages, up to the ideally perfect man in a perfected human society, we are justified in regarding him as originally a frugivorous animal; as then forced, by the lack of his natural food, to subsist partially upon flesh; again, as emerging from a savage state and becoming a peaceful tiller of the soil, and chiefly frugivorous, yet retaining his acquired taste for flesh, and indulging it most in the more corrupted states of civilization and of indolent luxury; and finally as recognizing his own true nature, and returning to his original diet, under the guidance of science and the moral instincts.

The remarkable accordance between the development of a race, and of the embryonic life of the individuals belonging to it, which we have here presented, is of the widest application, and serves to show the dietetic relationship of various groups of animals. From it we deduce the general proposition

that the dietetic character of the individual is that of the race in miniature. Guided by this double parallel between the race and individual development, on the one hand, and of comparative anatomy between man and the other placental animals, on the other, we have an excellent, even if not a conclusive, evidence for the frugivorous character of man.

The most important changes which man has undergone in his process of development, since he began to take on the distinctively human character, relate to his external form; as, for example, his adaptation to life upon an open plain, and his upright gait, and consequently his fine development of limbs and hands, the loss of his hairy clothing, and the change from a prehensile to a flat foot. These purely mechanical changes could have occurred in a considerably shorter time than that of the claimed dietetic change, since they accord with his instinctive feelings. Although we are unable to state the duration of the several paleontological periods of human existence with exactness, this much is known: that for man's gradual development, even within the ter-

tiary period, a vast amount of time was requisite. It is therefore unreasonable, when we consider the slowness of the process of evolution, to assert that so great a change as that from a fruit to a flesh diet occurred within the comparatively short period that must be assigned to it. The slowness of these changes by natural selection appears at the present day in the intermediate forms of *Pinipedia* and *Lutrina*, web-footed animals, among which are found the common sea-dog and the fish-otter. The former, which appears related to the sea-horse, is developed, probably, from the *Pachyderms*, the latter from a weasel-like carnivorous animal. Although both are still in process of transition, we find, nevertheless, their transitional forms as far back as the tertiary period.

An interesting addition to the known transitional forms is believed to have been found recently in the fossil remains of a hitherto unknown ape, the *Dryopithecus*. This belongs to the miocene period, and since it has been found in Spain it affords evidence of the existence of a European anthropoid in the middle tertiary period. This animal may be

regarded as an intermediate form between the gorilla and man.

The opinion that man has, by the process of development, been transformed from a frugivorous to a partially carnivorous animal is hardly justified, in view of the fact that not more than the tenth part of the human race have ever been flesh-eaters, and that ancient science and art flourished, especially, among vegetarian races, as in Egypt, Assyria, Greece, Italy and India. The history of the development of races teaches us that the various classes of animals, as the Carnivora, Omnivora, Frugivora and Granivora, took on these distinctive characteristics at a very early period, and that each tended strongly toward the complete development of its peculiar form of life. The present Carnivora may be traced back through a succession of forms, to the earliest periods of animal life, retaining everywhere their peculiar character. Another and wholly distinct series of forms gave rise to the various species that subsist upon the vegetable kingdom. The line of distinction is everywhere preserved. The assumption that man has passed this line, and been transformed into

a partially carnivorous animal, within a comparatively recent period, is contrary to all precedent and unsustained by the facts of his actual history.

In the development of animal and plant life, throughout all time, there exists a certain relation highly instructive in our present study. All life originated in the water. The lowest animal forms were nourished by the lowest plant forms, the ancient fishes by the sea-plants of that period, the monsters of the carboniferous period by the coarse and luxuriant vegetation now stored up in our coal beds, while the higher grains and fruits belong to the era of man and his immediate progenitors.

We have thus been led, by a review of all the sciences bearing upon this subject, to the conclusion that man is a highly organized animal, whose proper food is that of the vegetable kingdom, especially the higher fruits and grains. This accords with all that we have learned of his embryological development, his anatomical structure and physiological functions, his dietetic capacity and instinct-

ive feelings, his moral consciousness and sense of justice to his fellow-creatures.

The laws of man's nature, as thus established, cannot be suspended by the artificial methods of civilization without injury. His true position is that of harmony with nature; and in proportion as he rises in the scale of being he will find his nourishment more and more in the beautiful fruits and grains that, above all else, tempt the unperverted appetite and maintain the moral life.

Scientific Principles of Diet.—We have now, upon the basis of our studies in anthropology, the following principles of a scientific diet:

1. Every species and every individual is, or should be, nourished in accordance with his organization.

2. The dietetic laws of the individual correspond to those of the race, and are the product of race development.

3. Man is by nature purely frugivorous, as appears from our parallel study of embryonic, post-embryonic and race development and anatomical structure.

Influence of Food on the Character of Races.—Referring to human history, we may trace the character of races, and the cause of many evils, in the dietetic character of the people. It is not too much to assert that the solution of the great social questions of the present day would be greatly promoted by attention to the question of food. The rejection of flesh would give a new direction to human culture and industry. Agriculture would be greatly developed. The numerous diseases now traceable to a flesh-diet would disappear, and with them the manifold cruelties of the slaughter-house. The expense of living would be greatly reduced, and thus the poorer classes would be elevated. The recent investigations of Mr. Napier, with regard to vegetarianism as a cure for intemperance, have shown that one of the greatest of social evils would be in great part, if not wholly, removed, by placing its victims upon a vegetable diet.

The effect of a flesh-diet upon the human system is to excite evil passions, and to make men not brave and steadfast, but restless and quarrelsome—a condition exactly suited to

the purposes of those political leaders and ambitious monarchs whose lust for power demands such material for the prosecution of unrighteous wars. Such wars do not originate with the sober and industrious peasantry, whose food is mostly vegetable, and whose passions are moderate. Only through their patriotism, and sense of duty to their rulers, are these led from their homes, as victims of a base ambition. It is the rabble of the city, the flesh-fed and corrupted victims of a false civilization, that first applaud the decrees of war, of which the steadfast peasantry are alike the support and the victims.

Origin of Flesh-Eating by Man.—If flesh is unnatural food for man, wherein then shall we seek the origin of its use? We find it in the fact that the question of existence takes precedence of the question of food; hence, any animal will eat that to which he is not well adapted rather than starve. A traveler who sees the native Australian, whose means of subsistence are exceedingly scanty, catching and devouring the most loathsome worms and reptiles, will hardly assert that these are his most suitable food; but will rather recognize

the stern necessity that drives him to this means of sustaining life. Again, we find in all the cultivated races a tendency to deviate from the simple laws of nature to gratify a perverse ingenuity, and to exhibit skill in the production of attractive, though pernicious, articles of food. The artistic cook and the depraved savage thus join hands in devising means for perverting the natural appetite.

Changes in the Earth's Surface and Climate, Causing Great Changes in Man's Food.—The changes of surface and temperature, through which the earth has passed within the period of man's existence upon it, have had an important bearing upon the supply, and consequently upon the method, of nutrition. Our best anthropologists and philologists agree that man probably originated in the south of Asia, middle Africa, and especially upon the now sunken continent called Lemuria, lying between Madagascar and the Sunda islands. From here, as is evident from a study of comparative philology and the fossil remains of man, the human race gradually spread and became more cultured. In the miocene system of the tertiary period are found, united with

the remains of large and long since extinct man-like apes, the first traces of ape-men, though only in the form of fossils. It seems probable that, at the time of the emergence from the brute to the human condition, the species thus developed had extended very widely over the earth's surface. In support of this assumption we have the fact that the *Dryopithecus*, a large ape-man, existed in western Europe, even in the miocene period. The first traces of culture appear after the beginning of the glacial epoch. All the remains that we possess belonging to that period consist of bones, and indicate the existence of a race of hunters. The glacial epoch was one of very great change in the life conditions of all beings under its influence. Previous to it, during a vast period of time, a tropical climate existed over the entire earth, even to the Poles, as is plainly shown by the remains of plants and animals now found. Here the original man lived upon those wild fruits which he plucked from the trees, and ate without preparation. But these conditions of Paradisical abundance and indulgence were changed by the transition through which the earth passed as

the enormous ice fields extended gradually to the south, forcing the present tropical animals southward, and subjecting the more enduring and more ingenious race of man to altogether new conditions, by which his intellectual resources were greatly developed under the pressure of necessity. The "struggle for existence" must have been fearful, and compelled a resort to kinds of food hitherto repulsive.

The glacial area did not extend as far as the Tropics, and the conditions of life were here not changed; as evidence of which we find at the present time races in eastern Africa and southern Asia which still live upon vegetable food only. Within the glacial period occurred also a great change in the configuration of the land. The great continent of Lemuria sank beneath the level of the ocean. The waters of the Indian ocean broke through the Red and Mediterranean seas, formed the Persian gulf and opened the straits of Gibraltar. Man, hemmed in between the sea upon the south and the ice masses upon the north, was reduced to the greatest want. The tropical regions were probably as densely populated then as now, since a long period favorable to an-

imal life had already elapsed. The multitudes that were pressed southward, wherever the way was open to them, must have come into violent conflict with those whose territory they invaded. Under such circumstances, the choice of food was not natural, but forced, and hence might well have originated the use of flesh foods. The conditions of natural selection were by no means as perfect at this time as they had been during the tertiary period; in which a favorable climate, and especially the free migration of species, contributed to the development of new forms and to the ready adaptation to new and normal conditions. It appears that where circumstances did not favor migration, development through natural selection was much more limited. The present anthropoid apes had, at the time of the glacial epoch, the same characteristics as at present. The most important agencies in natural selection were the isolation of species by migration, elevation of the bed of the sea to islands afterward peopled, and other changes of the earth's surface. The great climatic changes of the glacial period do not appear to have caused the development of new species, though it influenced the character

and habits of those already existing. The present species had their origin apparently within the enormously long tertiary period, with its great changes in the configuration of the earth's crust. So considerable a physiological change as that involved in a real transition from a frugivorous to a flesh diet would have carried with it anatomical changes of so important a character as to have generated a new species of the human race, but this has not been the case. There are tribes that have lived upon vegetable food for thousands of years and yet show no difference in the form of their teeth from those of the Europeans. Examples of this kind are to be found in the inhabitants of some of the islands of the Pacific ocean.

A New Epoch.—After the subsidence of the ice period, the high north, which previous to it had bloomed with tropical life, was converted into an unfruitful and worthless region. Europe, covered with impenetrable forests and dismal swamps, lay under a gray sky and in an atmosphere loaded with vapors. Man, fallen from his condition as a fruit-eater, and impelled by necessity, learned the use of fire and began

to cook his food, which still consisted in part of flesh. This was long before the stone age, and is called the bone age, on account of the great abundance of the bones of men and animals found in the caves still existing, in which men lived like beasts. The cave-bear and lion, the ure-ox and elk, giant stags and mammoths, contended here with man in a miserable struggle for existence, and the mingled remains of all as now found indicate the condition of human life at that remote period. All the implements found among these remains relate to hunting, being either the weapons of the chase or tools used in making such weapons, and all are made of the bones of long extinct animals, such as the bear, rhinoceros, and others. Hunger drove men to fearful extremes, and the chief energies of life were consumed in its coarsest satisfaction. Even carnivorous animals were devoured by men, as is apparent from the marks upon the bones split open for the marrow.

The Stone Age.—The men of the stone age lived under more favorable conditions, as we learn from the remains of their food still found in their former dwelling-places. There

are traces of different kinds of vegetables, apples and berries, yet the practice of flesh-eating, once established by necessity, could not easily be relinquished. The natural instinct could not at once reassert itself, yet the gradual improvement of society, and the thoughtful study of the human body, led thinking men by degrees to the conclusion that man was not organized to destroy other animals for food, but that this practice tended to make him savage and to lower his whole character. Thus it is that the pure teachings of nature have in all ages and among every people found, here and there, a few capable of receiving and applying them.

Origin of Agriculture.—Since men cannot live on flesh alone, and since nature after the glacial epoch provided fruits and grains, spontaneously only in the warmer regions of the earth, it became necessary that man should provide them for himself. In this necessity agriculture had its origin—and if there is any evidence of the frugivorous nature of man, aside from his anatomical structure, it is in the fact that he tills the soil. It may also be assumed that the necessity of pro-

viding fruits and grains for food developed the understanding and led man to reflection.

Man by Nature Frugivorous.—There are yet tribes in the south who practice the natural manner of living prevalent all over the globe before the glacial epoch. They did not even know the use of fire until Europeans taught it to them. It is a fact that they know little or nothing of disease and live to an advanced age. It may be that their methods of culture and their religious opinions are very objectionable, nevertheless they afford us good evidence that a frugivorous diet is highly favorable to health of body and length of life.

Since, also, the fossil bones of man found in the tertiary are larger and stronger than those of the historical epoch, we may conclude that the fruit and grain foods on which he then subsisted were more favorable to physical development than is the mixed diet of our own time. In short, in whatever manner we conduct this investigation, if it is only done logically, and includes all the biological evidence, we can only come to the conclusion that man is by nature, by development, and

in all his tendencies, frugivorous; that his change to a flesh or mixed diet was purely one of necessity; and that the present use of flesh food has its foundation only in custom, and has become the source of many diseases and infirmities. And if fruits and grains are man's natural food, it is also evident that they are able to give him strength to endure cold and to perform the most exhausting labors, and that we are not benefited by departing from their use.

Science has for its mission the discovery of truth. It is satisfied with establishing the facts; the wise application of them to the necessities of daily life she leaves to man. Well, indeed, is it for those families who, with a correct knowledge of the principles we have here endeavored to establish, are able to banish bloody food from their tables. In so doing they have ennobled themselves. Their choice of foods from the many fruits and grains, vegetables and roots, is so great, the changes which they can make are so manifold, the fruits are so nourishing, so healthful, so agreeable to the taste, so pure and refreshing,

that there is continually a new and high delight in each repast.

Personal Experience.—The number of those who have chosen a natural diet is steadily increasing, and such show in their healthy appearance and their inward contentment how truly Nature rewards the observance of her laws. But even among these there yet remains something to be wished. The force of old custom, and the seeming necessities of those whose health has already been impaired, render an immediate and abrupt change difficult. Yet I can testify from my own experience that, when wisely entered upon, the principles here advocated are strictly practicable, and the more so when carried out to their fullest extent—that is, by the adoption of a diet consisting of fruit and bread only—and I would especially recommend to those who have the care of the young that they pursue this course. This diet also bears the test of scientific criticism, and to this science must at last come if it pursues the right course.

PART II.

PHYSIOLOGICAL ARGUMENT.

As already shown, the chief error which has been committed in the establishment of dietetic theories consists in estimating the value of the various foods according to their chemical elements, while leaving out of consideration the character of the organism by which they are to be assimilated. But the question of a scientific diet is far more anatomical than chemical. As evidence of this, let us consider the digestive apparatus of man and compare it with that of the lower animals.

The Saliva.—The saliva of a healthy man has but a slightly alkaline reaction. The food to be acted upon by it must consequently be of such a nature that it may be saturated by the saliva, and, to a certain extent, dissolved by it. We find this, however, to be

the case only with fruits; for flesh, eggs, alcohol and other articles are but slightly affected by saliva, and mostly only mechanically mixed with it. The saliva of carnivorous animals is slight in quantity, but sour, and thus capable of dissolving the food whole. The digestive organs and course of nutrition of the anthropoids is essentially the same as that of man. Vegetable food, when completely masticated, affords a sweetish taste, because the starch which it contains is, by the action of the saliva, transformed into sugar. This is especially the case with fruits and grains, but not at all true of flesh.

The Gastric Juice.—A leading element of the gastric juice is lactic acid ($C_{12} H_{10} O_{10} 2 HO$). This excites a slight fermentation of the chyme, and thus exerts an influence upon the digestion of vegetable, but not upon that of animal, food. It is far too weak to act upon the fibers of animal flesh. All fats are insoluble in water, spirits of wine, and acids. Flesh, when eaten by man, tends to undergo a process of decay in the stomach, causing a scrofulous poisoning of the blood. In this unnatural action lies the cause of many com-

plaints and disturbances of the system: as bad breath, heart-burn, eructations, and vomiting. In the case of the Carnivora the gastric juice exerts a decomposing influence upon flesh and causes its assimilation and excretion. Since the pancreatic juice of the duodenum, into which the chyme passes from the stomach, bears a close resemblance to the saliva, it follows that the chyme here, also, can have only a slightly acid property, which it indeed can only have when it is of a vegetable character. Bile, which is here poured into the intestines, has only a slight alkaline reaction, and its use seems to be limited to the prevention of decay, which, however, can only occur in the case of flesh-food; so that the effort of nature to maintain flesh-food in its proper condition by the secretion of bile must be excessive, and must evidently cause an excitement and weakening of the whole organism.

In the case of fermentation, through the decomposition of sugar, alcohol is formed,* and is essential to nutrition, being retained in the

*This statement, concerning the formation of alcohol in the system, has not yet been generally accepted by physiologists.—*Translator.*

blood, yet when taken in its pure state into the system in the form of spirituous drinks it acts most injuriously. In this form it weakens the entire digestive system, and is absorbed by the lymphatic glands of the stomach, from which it passes into the blood vessels, in a manner unnatural and injurious. Let no one, therefore, be deceived by the pretext that a service is rendered to nature by supplying it gratuitously with that which it prepares for itself by a natural process, through the action of the saliva and fermentation; for that which has already fermented cannot, upon being introduced into the system, again take part in the normal process of digestion. It acts only as a foreign body, which must be carried or excreted at the expense of those organs which are compelled to endure its presence.

Excretory Products.—In accordance with these principles, we find a marked difference in the excretory products of different animals. In the Carnivora the reaction of the urine is acid, while in the Herbivora it is alkaline. In man it is usually acid, though it varies with the nature of the food. It is a well-

known fact that a diet consisting largely of flesh may seriously change the urine, causing it to be very offensive, while that of those who consume much fruit is peculiarly free from abnormal or offensive qualities. Similarly, the perspiration of flesh-eating men is rich in buttric acid and ammonia, and has an offensive and decidedly sour smell. The overloading of the blood with flesh-foods causes, in order to their decomposition, an excessive consumption of oxygen, and hence the difficulty of breathing and asthmatical affections of many flesh-eaters, and their excessive excretion of carbonic acid.

Nature's Provision for Man.—If now man is, as shown by his development and organization, frugivorous, it must be that nature provides for him all that he requires for his sustenance, completely ready, and without the necessity of artificial preparation, and this we find to be actually the case. The original southern home of man presents these fruits in great abundance. The most of them are juicy; and the most important among them are figs, dates and almonds, olives, bananas, sweet potatoes, melons and grapes, bread-fruit, chest-

nuts, cocoanuts, and, among grains, especially Indian corn. In the north we have an enormous treasure of juicy fruits, to the culture of which too little attention is given. I refer especially to cherries—of which we have many varieties—currants, gooseberries, strawberries, blackberries, mulberries, raspberries, plums, prunes, peaches, apricots, apples and pears of the most various kinds, grapes, melons, walnuts and hazel-nuts.

Order of Maturity of Fruits.—It is a remarkable fact, apparent throughout nature, that the fruits mature with the seasons in the order best adapted to the wants of man, their qualities and abundance meeting his successive requirements. The spring presents us with the first refreshing fruit, the strawberry. In summer we have in great abundance the currant, cherry, peach, raspberry and gooseberry; the plum, prune and apricot. Autumn, with its cool and rough weather, ripens the juicy and nutritious pears, apples and grapes; while winter warms us with fatty and oily nuts, almonds and chestnuts.

Necessity of Variety in Food.—The human system requires a great variety of fruits, and

the natural appetite demands, at each season and period of life, that which health requires. The proper supply of carbonaceous and nitrogenous material is thus, through obedience to natural instinct, provided. Fruits and grains afford all the elements requisite for the formation of flesh, blood and bone, but these are never found here in so concentrated a form as in flesh. Beans and lentils also are an exceedingly concentrated form of food, and contain such an excess of nitrogenous material as to load the system with it to an injurious extent. An unperturbed appetite will demand fruits before such food.

A person who has lived too exclusively or too long upon fruits will feel a craving for more solid and concentrated food. The teeth will demand something harder to masticate, and the stomach and intestines will require the mechanical action which is peculiar to grain foods. By the use of both fruits and grains in the right proportion, the body is supplied with all the elements of nutrition. If nature required anything in addition, the natural appetite would demand it, but it does not, though a perverted appetite may.

As nature, through instinct, determines for us the proper quantity of food, so does it also determine the manner in which it should be eaten. The perfectly natural appetite requires no artificial preparation of food, but accepts it from the hand of Nature, exactly as she has prepared it. We eat the ripened fruits as they are plucked from the tree, and man, in a state of nature, would also relish the various grains without artificial preparation; as is indeed the case among many southern tribes, at present, and as doubtless was the case with man everywhere in his primitive condition.

Origin of Cookery.—The practice of cooking among northern races had its origin, not in the necessity of warming the body by the heat of the food, but in the fact that less of juicy fruits were found in the north, and it seemed therefore necessary to soften the grain foods by cooking. The present custom of cooking our food seems necessary only because it is customary. In the existing state of agriculture and horticulture, it is quite possible to provide a sufficient variety of foods in a natural state for the supply of all wants.

Value of Foods.—The value of the various articles of food consists not, as is generally supposed, in their chemical constituents, but in a variety of other conditions, which we shall here mention: In the first place the food must contain the necessary amount of water to maintain the excretory processes through the breath, perspiration and otherwise. Fruits contain the most abundant supply of water, so that when they are eaten freely the drinking of water is almost entirely unnecessary, and the vegetarians are really justifiable when they say, “We drink fruit”; and they might also add, “We eat water.”

Bulk Necessary in Food.—An abundant flow of saliva is essential to complete mastication and digestion, but in order to its secretion the food should contain a certain bulk, in proportion to its nutritive constituents. Highly concentrated foods fail to exert that mechanical influence upon the digestive organs which is essential to their complete activity. By relieving these organs of their proper work, as is the case when the food is too soft or of too little bulk, the system is enfeebled, just

as the muscles are by a lack of proper exercise.

The Vitality of Food.—Finally—and this is a point that physiologists have hitherto quite overlooked—the food must contain a certain *electrical vitality*. Although the real origin and nature of the vital force is not yet known, we believe that it is closely related to electricity; not less so, indeed, than to light and heat. Electricity is abundant in all purely natural products, and indeed everywhere where a free and uninterrupted exchange of the influences of light, heat and air exist. It is less abundant in closed dwellings and sleeping-rooms than in the open air. An outdoor walk refreshes us, not only by the increased consumption of oxygen, but by the increased action of the electrical forces. The same vitality is stored up in uncooked plants and fruits, but is greatly impaired by all our culinary processes. Fruits act also through their natural acids, their refreshing coolness, and the easy assimilation of their albuminous products, and other nourishing materials.

By the electrical vitality of a food, we do not mean its nutritive worth, nor indeed any

material element of it, but rather an imponderable fluid, which is related to the vital and electrical forces of the human system. The organic vital force has not incorrectly been called the interrogation point of physiology, and the physiologists and chemists of the old school thought to maintain this force by supplying albuminoids to the system. The fact, however, is the reverse. The albuminoids demand rather a great expense of vitality for their solution and digestion. We know now, with great certainty, and by practical experience, that the human system is maintained and strengthened by the consumption of fresh air, fresh water, and ripe fruits, and grains; but these essential means of sustenance are reduced from the rank of vital to merely nutritive substances by any treatment that, through heat or otherwise, destroys their natural vitality. Our physiologists have not hitherto understood this difference between the vital and the merely nutritive properties of food, and hence, as we have already pointed out, have regarded foods merely as chemical substances. They have discovered and laid down, with wonderful exactness, the chemical elements of

the living body, and hence of the food requisite, according to their views, to its maintenance; but we hope to show in the following pages that their methods, and consequently their dietetic conclusions, have been one-sided and essentially erroneous. So long as the electrical vitality of food is overlooked, and the bearings of anthropology upon the question ignored, a scientific system of diet must remain impossible.

The Essential Qualities of Food.—The value of foods consists not in their nutritive properties alone; but in their proper proportion of fluids; in the necessary bulk, by which digestion is rendered possible; in the natural stimulation of their juices and acids; in the aroma by which the appetite is aroused and its regular recurrence promoted; in their chemically neutral character, which prevents their generating acids or forming injurious compounds in the stomach; in their freedom from those unnatural stimulants by which a vicious appetite is created; in the purity which guards the system against corrupt humors and diseased conditions; in the refreshing coolness which maintains the digestive organs at a proper

temperature and in a vigorous condition; in their perfect adaptation to the nature of the digestive organs, so that they may be transformed into blood without doing violence to any part of the system; and, finally, in that electrical vitality which renders them analogous to living beings, and the absence of which reduces them to a condition of physical death. These properties are united in their highest perfection only in uncooked fruits and grains as they come from the hand of Nature; and the unperverted appetite demands nothing else.

Injurious Effects of Cooking.—Of all the artificial forms of treatment to which foods are subjected, that of cooking is the most universal, and therefore demands here our especial attention. If we rightly consider the influence of this process upon all the natural properties of a plant, we must concede that it is in almost every case injurious, and that it should be dispensed with, so far as our present habits of life will admit of, and with a view to its final and complete disuse. The natural fluids of the plant are, in great part, lost in cooking, and with them the natural

aroma so agreeable to the senses and so stimulating to the appetite. The water, supplied artificially, does not possess the same properties as that which has been lost, and all the less so since it has been boiled. The cellular tissue of the plant loses also its vitality, and ripe uncooked fruits and grains, with their unbroken cellular tissue, their stimulating properties, their great content of water, sugar and acids, and their electrical vitality, are calculated to impart to the human body a rosy freshness, to the skin a beautiful transparency, and to the whole muscular system the highest vigor and elasticity. Uncooked fruits, especially, excite the mind to its highest activity. After eating them we experience an inclination to vigorous exercise, and also an increased capacity for study and all mental work; while cooked food causes a feeling of satiety and sluggishness. Not only do plants lose their vital, but, to some extent, also their nutritive, properties when cooked. The vegetable acids and oils, the latter being of especial value in the development of the bony structure of the body, are, by cooking, dissipated; while the albuminoids are coagulated,

and thereby less easily digested, so that the nutritive value of the food is reduced to a minimum. Another injury that results from cooked food is that caused by the artificial heat. All heat excites, through expansion, an increased activity, but this activity is not normal in the case of food eaten hot.

Again, the sensory nerves of the lips and the nerves of taste are weakened by hot food to such an extent that they no longer serve as an infallible test of its quality, and hence articles that seem in the mouth to be palatable and good may be very injurious to the system, both on account of their natural properties and their artificial heat. In a similar manner the sense of smell is blunted; and not less injuriously does hot food act upon the teeth, the enamel of which is destroyed, rendering them unfit for their work of mastication, in consequence of which the food passes unprepared into the stomach. The eyes are also injured by the action of hot food upon the nerves connected with them. That condition of weak and watery eyes, so apparent in the habitual drunkard, exists in a certain degree with all whose systems are enervated by hot

and stimulating foods. But the greatest harm from hot food is caused in the stomach itself, the coats of which are irritated, reddened, and unnaturally contracted by the heat, so that they lose their vigorous activity and capacity for the complete performance of their natural functions. The blood excited by the heat flows in excess to the stomach, and thence feverishly through the body. One result of this is the flushed condition of the head after eating. Hot food also causes excess in eating, so that it is rather by a sense of fullness and oppression than by a natural satisfaction of the appetite that one is prompted to cease eating. An evidence of the weakening of the stomach by hot food is seen when one eats an apple immediately after the usual hot meal. Fruit thus taken lies like a stone upon the stomach, the enfeebled nerves being injuriously affected by its presence; whereas, in their normal condition, they are stimulated to a most agreeable activity by it.

From the abuse of the organs of digestion result a host of diseases. A life-long weakness of the gastric nerves, with cramps and inflammation of the stomach, are its common fruits.

To this cause also is attributable the almost universal prevalence of colds, which are the direct result of unnatural temperature conditions of the body. The blood artificially heated causes an excessive perspiration, since it produces an increased, but injurious, activity of the skin; and upon the least change of temperature, the perspiration is condensed upon the body, and causes colds and stiffness, and this all the more certainly when the blood is impure and the tissues overloaded. From the same prolific cause results also the uneasiness and languor experienced after eating hot food. But the evil effect cannot be overcome by the usual after-dinner nap. This cannot replace the elements lost from our food, nor give the enlivening impulse experienced after partaking of ripe fruits in their natural state.

It is indeed argued that our northern climate requires that food should be eaten hot as one means of maintaining the bodily temperature; but if this be true of man, it must apply with equal force to all animals; and since man alone seems to require hot food, the argument loses its force. In the polar regions, the conditions

of animal life show plainly that the natural process of generating heat is not by putting heated substances into the stomach, but by the normal action of the vital forces upon food taken in its natural state. Greater thirst is experienced after eating cooked than uncooked food, and this results both from the change which the food has undergone and from the perspiration caused by the increased heat of the body. The artificial solution of the food impairs its nutritive properties, and weakens the natural functions of the body by depriving them of their natural employment; and this has been so long continued that we are now almost incapable of digesting uncooked grains, so that their enlivening and invigorating action is almost unknown.

The modern kitchen has thus perverted the natural appetite, and enfeebled the natural powers. It has, also, fostered injurious customs, and introduced articles of diet that would otherwise have been excluded. Only through its aid can the flesh of animals be rendered palatable. Its abolition, gradually, if not at once, would contribute much to restore man to his normal dietetic conditions, and would

exclude the most injurious parts of his present diet.

Salt and other Condiments.—With regard to the artificial seasoning of food, we need here to say little. All vegetarians disapprove of it, for the most part, though many of them still continue the use of common salt. It seems in no way to build up the body, and those who dispense with it altogether soon experience an improvement in the sense of taste which adds greatly to the enjoyment of food. Some writers have asserted that it is not possible to exist without salt; that the want of it causes a softening of the bones. But they overlook the fact that all plants contain salt sufficient for the requirements of the system. Various other mineral substances, as phosphorus, lime, and soda, enter into the composition of the human body; yet we do not think it necessary to take them separately into the stomach.

Milk.—Among animal products much consumed by vegetarians, milk is one of the most common. This, however, is not only entirely unnecessary, but, in many cases, positively injurious. Water answers every purpose

where it is necessary to add fluids to the food. But even if pure milk were beneficial, the difficulty of procuring it is to be considered. The residents of cities seldom know whether the milk which they purchase is from healthy or unhealthy animals, or whether it has been adulterated. Diseases may be transmitted to the human system through the milk of an unhealthy animal, as well as to an infant by the milk of an unhealthy nurse. Tuberculous diseases are often prevalent among neat cattle, and to their milk might be traced many cases of like disease the causes of which remain unknown. It is not at all certain even that the boiling of milk destroys the germs of disease which it contains.

If we consider the natural purpose of milk in the case of all animals we must concede that it is not designed for adults. Milk is everywhere the natural and proper food of the new-born; and when once weaned from the mother's breast, no animal, except man, returns to it, or to a substitute for it, in the form of nursing at the breast of lower animals. This is, in effect, what man does, but it is only one of the many examples of the per-

version of his natural instincts, in justification of which he pleads his supremacy over nature, and over the "beasts of the field," from which, however, he might well learn a useful lesson here, as elsewhere.

Butter, Cheese, and Eggs.—What we have said of milk applies equally to butter and cheese. These cause an excess of fat in the system, and an offensive, slimy condition of the mucous secretions in the mouth and nose, quite apparent to those who, contrary to their usual habit, eat of them. Their effects are often apparent, also, in eruptions upon the skin, especially upon the face. Let a person thus disfigured disuse these articles, as well as all fat meats and grease-cooked foods, for a time, and if a clear complexion rewards the sacrifice of old appetite, there will, perhaps, follow still further effort, leading to a completely normal and healthful diet. Eggs, also, are unnatural food. They are designed by nature only for the nourishment of the embryo, just as the seed is for the nourishment of the germ within it.

The best evidence of a proper state of the juices and secretions of the system is found in a

pure and tasteless condition of the mouth. Impurity of the fluids is apparent in a bitterish, sour or saltish taste, and in a slimy or fatty character of the mucous secretions. These impurities are most apparent after eating eggs, butter, milk, cheese, honey and pastry, and are often accompanied by flatulence and eructation; but these latter are only nature's methods of expressing aversion to indigestible foods. Butter, which seems, to most, an indispensable article, is in reality very objectionable. It disturbs digestion, causes heartburn in those at all liable to this affection, generates an excess of fat, and in many persons causes a general stupor of the system—the best evidence of which is seen in the improved condition of the mind when its use is for a time dispensed with. Milk and cheese, having the same origin, are of a similar nature. The nutritive value of all these popular articles of food is more than counterbalanced by the injury which they do. With the foods commonly eaten they seem necessary, but no one who is provided with an abundance of man's genuine food, namely, fruits, grains and nuts, will ever need to resort to them, or experience a craving for them, when

once the system has been purified from their effects. While it may be difficult to show, upon theoretical grounds, that these articles are unsuitable as human food (excepting only milk for infants), the greater mental clearness, and the purity of the excretions and of the breath, when they are replaced by ripe fruits, is an unanswerable argument against them, to the truth of which many can testify from actual experience.

The argument in favor of butter, and other fatty substances of an animal origin, based upon the necessity of supplying the system with fat-producing material, assumes that man is by nature carnivorous, and that the carbonaceous or fat-producing foods, which he requires to generate and sustain the proper heat of his system, must come from the animal kingdom. In reply to this we have but to refer to facts which cannot be denied. Fat-producing elements abound in the vegetable as well as in the animal kingdom. The solid fat of the swine is derived best of all from corn and apples, and yet this animal is no strict vegetarian. He is precisely what the advocates of a flesh diet claim that man is, namely, omnivorous. Judging from

this standpoint, then, man should be able to maintain his animal heat upon corn, sweet apples and the other vegetable foods that give to the swine such an enormous superfluity of fat; and if, as we have endeavored to show, man is, in his original nature, strictly a grain and fruit eater, then may we all the more regard these foods as sufficient for him in this respect. The fattening quality of sweet apples is proverbial among farmers, whose children are especially noticeable for the plumpness of their forms during the season of this fruit.

Nuts are especially to be recommended to vegetarians. They satisfy a demand of the appetite in winter, and their oily nature is apparent to those who cannot see the same quality in fruits and grains, where it nevertheless exists in great abundance.

Honey and Sugar.—Of other articles injuriously added to our food, honey and sugar are as objectionable as they are popular. Both generate an unnatural acidity of the stomach, which is apparent in the disagreeable eructations which they cause. They blunt the nerves of taste and leave a prickling sensation upon the tongue. In addition to this, honey fills the system with

æthereal oils and wax, which can in no normal way be appropriated.

Pastry.—The various articles of pastry are also for the most part unsuitable food. They contain unhealthful ingredients which disturb digestion and corrupt the blood. From a natural diet we may well exclude them all as at the best superfluous.

Tea and Coffee.—Tea and coffee are by some writers said to promote digestion, but this assertion only betrays an ignorance of physiological law. The principal action of both these drinks is caused by the peculiar aromatic alkaloids, thein and caffenin, two poisonous substances which accelerate the action of the heart and abnormally excite the nerves; and although from long use their effects may be concealed, their secret influence is continued. That such poisons cannot be converted into food, nor assist in digestion, is self-evident. Their chief action consists in the solution and softening of the food and excrements. They promote, therefore, not digestion, but excretion, and thus unduly hasten the natural processes. The same is true of chocolate, the claimed nutritive value of

which consists in its added ingredients of flour and other articles.

Intoxicating Drinks.—These are of a similar character. The alcohol which they contain unnaturally enlarges the blood vessels, consumes the entire organism, causes a feverish heat, disturbs the action of the brain, and, taken in great quantities, leads to the softening of this organ and to the demoralization of the entire system. Schnapps taken to promote digestion temporarily excite the nerves of the stomach, and cause thus an excess of blood in that organ; but the theory that they are really beneficial is wholly delusive.

Flesh Foods.—We come now to consider the influence of flesh as food upon the bodily as well as upon the mental and moral life of man. In this we reach the vital point of the reform which vegetarians are striving with so much zeal and courage, and in such a spirit of personal self-sacrifice, to inaugurate. In the use of flesh is involved the use of a great variety of not less injurious substances, such as beer, coffee, tobacco, etc.; and I shall now undertake to show that by far the greater number of chronic complaints owe their origin to flesh-eating, and this by a simple pre-

sentation of the facts of observation and experience.

With the flesh which we consume we must consume also whatever living or dead substances are contained in it, and thus take into our systems in many cases the germs of disease, as in the case of parasites, trichinæ and the like. This danger is all the greater since animals fattened for slaughter are more or less diseased, in consequence of their unnatural mode of life while subjected to this process. Carnivorous animals are not at all exposed to this danger, since they prey upon wild animals, which live in a natural state, and, besides, their own digestive organs are perfectly adapted to such food. Man, however, not only eats food for which he has no natural adaptation, but eats it in a more or less diseased condition.

Again, all flesh being a product of nutrition, it contains a certain amount of refuse matter in process of elimination from the system; and these worn-out particles, which are in the nature of excrement, are necessarily conveyed with all their impurities into the human system when flesh is eaten. Among these refuse materials are several which are

intensely poisonous, especially *creatine*, an alkaloid equally as injurious as strychnine, or as nicotine, the poisonous element of tobacco. Its action is similar to that of alcohol and tobacco. In contact with the walls of the digestive apparatus, it causes an unnatural activity of the entire vascular and nervous system, producing a condition similar to that of intoxication. In proportion as foods thus act, they lose their true nutritive value, for a pure and simple food cannot stimulate, and a stimulant cannot nourish. All true foods, as bread and fruits, exert a quieting and cooling influence upon the body.

A further characteristic of flesh-foods is that they enrich the blood unnaturally with fibrin, and as a consequence produce unnatural heat, or, rather, inflammation. This feverish activity causes, again, an excessive secretion of gall, which, as is known, adds still more to the irritability of the system. We may thus fairly attribute the nervousness which with many persons increases with age to a flesh diet. The assertion that flesh is more easily digested than bread and fruit is quite erroneous. Rice is digested in one hour, while veal requires

from five to six hours. Leguminous plants, milk and good bread are digested in two hours, but swine's flesh requires five hours and sometimes much longer.

Diseases Caused by Flesh-eating.—The natural consequence of stimulating and exciting food is the great tendency to fevers. The immediate cause of fever is nervous excitement, induced by the effort of the system to throw off injurious substances which have been introduced into the circulation. The devoted mother, watching through the sleepless night over her feverish child, knows not the cause of its sufferings, or how to relieve it. Alas! when to the disease is added the use of medicines, and of heating instead of cooling remedies. The true remedy would be found in a fresh-water bath and a suitable diet.

Rheumatism and Gout have their origin also in a bad condition of the blood, in consequence of which abnormal matter is deposited in various parts of the system, especially in the joints. This process may continue for years unobserved, until a sudden cold brings on the most painful inflammation of these parts.

Consumption.—In the great cities of the civilized world, among populations living largely upon flesh, from one-third to one-half of all adults die of consumption. The existence of this disease cannot be charged to any one cause. An unfavorable climate, impure air, overwork, irregular habits, and various other influences, combine to produce it. But it is always closely related to the state of the blood, and as this in turn is greatly influenced by the food, we are justified in regarding any vicious system of diet as one cause of those diseased conditions of the body which are gradually developed into consumption. In this, as in all affections of the blood, there is formed a pus-like, scrofulous matter, and this, deposited in the lungs, causes tuberculosis. The more impure the blood becomes, in consequence of a false diet, the more rapidly do the lungs decay.

The medical treatment of consumption is rarely successful, as it relies upon stimulation rather than upon proper hygienic agencies. It employs what are called strengthening foods and drinks, such as flesh, wine and beer; but it is a fact easily verified that, other conditions

being equal, consumption is most prevalent where these things are most abundantly consumed.

The constant use of flesh increases the action of the heart, and thus prematurely exhausts the vital forces. With this unnatural increase of the animal heat there is a corresponding excitement of the animal passions, which is falsely regarded as courage and energy. The urine of the flesh-eater is sour, and often deposits a thick sediment, the excrement is highly offensive and the evacuations often painful and difficult.

The origin of so many diseases, through the eating of flesh, is easily explained. The impurities thus introduced into the blood are deposited in various parts of the body, according to the temperament and natural tendencies—in one case as tubercles in the lungs, in another as gouty or rheumatic deposits at the joints, and in others as ulcers or abscesses in the stomach and intestines. For such affections the only true remedies are those that restore natural conditions to the entire system. These are light, air, water, exercise, rest, a proper temperature, and a suitable diet.

The Skin.—The condition of the skin has an important influence upon health, and in this connection we have to mention the use of soap as a means of cleanliness. This article is not necessary, but only injurious to the healthy body. Where the diet is proper the excretions of the skin are so pure and so slight that simple washing with water is all that is necessary for its cleanliness, softness, and beauty. The principal ingredient of soap is an animal fat combined with æthereal oils, corrosive lyes, and other injurious substances. These not only excite the skin and increase its sensitiveness to atmospheric changes, but actually consume its outer tissues and tend to give it a rough and wrinkled appearance. These substances are, also, in consequence of the absorptive power of the skin, taken into the system, where they give rise to various diseased conditions.

Where anything more than pure water is needed for cleansing the skin, fine sand or corn meal may be used and will be found to answer every purpose. This with the vigorous use of the towel is all that is in any ordinary case necessary to the utmost clean-

liness, and to that beauty and freshness of complexion for the attainment of which so many useless and even injurious means are employed. The fashionable cosmetics have of course no place among the natural means of health or beauty. They are to be classed only with the many other products of the laboratory and of the kitchen by which it is sought to counterfeit health or to produce by artifice the vigor and elevation of spirits which rightly result from a simple and natural mode of life.

The disuse of soaps and cosmetics, and the replacing of them with natural means of cleanliness and beauty, causes a great improvement in the mental as well as physical condition.

Quantity of Food.—It has been falsely held that in proportion as the labor is severe the food should be taken in a more concentrated form. But in reality the demands of the system are more for fluid than for solid substances. During severe labor, thirst is more keenly felt than hunger. This shows that the fluids of the body are more rapidly exhausted than the solids, and hence all that

is requisite in case of increased labor is an increase in the quantity of the food; but there is no real occasion for changing its character.

The experience of foot soldiers and of travelers in mountains is that, with an abundant supply of good water, the longest marches can be made; and, after such fatigue, a meal of fruit and bread refreshes and reinvigorates much sooner than one of a more concentrated and albuminous character. Cooked nitrogenous foods suffice, indeed, for nutrition, but not for enlivening and refreshing. It is a false principle of the modern chemical theory of nutrition, that the body should be nourished with as little digestive labor as possible, by means of flesh, eggs, and other concentrated albuminous foods.

It is a significant fact in nature that the more nutritive a food is, as, for example, wheat, leguminous plants, nuts, seeds, or dried fruits, the harder they are and the more they require to be masticated and insalivated. In this Nature seems to give us an intimation that we should eat proportionably less of them and should satisfy the natural instinct for more

juicy and vitalized fruits, in preference to the dry, hard, and concentrated albuminous products. We have here, also, an indication that we do not require so great a quantity of solid nutritive matter in any form as is generally supposed, or as is claimed in support of the current theories of nutrition.

Carbonaceous Elements of Food.—Within the past few years the theory concerning nitrogenous foods has been considerably modified. It is now known that vigorous muscular labor causes a very great increase in the consumption of carbonaceous elements in the system, while this has not been shown to be the case with regard to nitrogenous elements. That carbon is largely consumed in muscular action we know from the following facts:

1. That the worn-out particles of matter in the system are conveyed back into the blood, chiefly through the muscles.

2. That this effete matter contains a large proportion of carbonic acid, as is seen in the more venous condition of blood taken from a muscle when in action.

3. That during muscular action a considerably increased amount of carbonic acid is

exhaled. From these facts it is plain that the body is sustained during physical labor more largely by the consumption of carbonaceous than of nitrogenous foods. Although the muscles themselves consist principally of nitrogen-bearing albuminous products, yet in their action they consume carbonaceous matter greatly in excess of albuminous. In this they may be compared to a furnace which though consisting of iron does not largely consume this material, but which is fed by the carbonaceous coal and wood which is supplied to it. If the exhaustion and rebuilding of the muscular tissues, through the supply and elimination of nitrogenous substances, were as great as is generally believed, or as might be inferred, from the great consumption of nitrogenous foods, there would result great exhaustion and weakness in these tissues. They could not have that firmness and strength that results from retaining their elements longer and being more slowly exhausted and renewed.

In these facts we find an explanation of the difference between plant and flesh eating animals. The former are much more enduring, and capable of steady and protracted

labor, because their food contains a very large proportion of carbonaceous elements. The Carnivora, on the other hand, although having powerful muscles, are far less enduring. The case is similar with man. The excessive supply of nitrogenous elements through the eating of flesh, or even of the more nitrogenous vegetable foods, as beans and other leguminous plants, is not calculated to increase the strength.

How often do we see a person, who, according to his own opinion and that of his physician, lives well and upon "strengthening foods" and drinks, yet who, with wan and pale face, and bloated abdomen, goes shivering and groaning through life. In such a case relief can only be obtained by the abandonment of this "strengthening food," falsely so-called. Fourteen days of a fruit and bread diet would reduce the thick paunch and give more color to the cheeks and less color to the nose, thus showing that the sufferer had chosen the true road to health. That fruit and grain foods afford every element of nutrition is apparent, not only from the instinct that demands them, and from the health and

satisfaction which they give, but from the chemical analysis also, as presented in the following chemical elements of food:

PERCENTAGE OF ELEMENTS.

Wheat: starch, 65; fat, 1.42; albuminoids, 15.20.

Apples: sugar, 8; pectin, 5.5; pectose, 1.2; albumen, 0.39.

Pears: sugar, 11.5; dextrin, 2.07; albumen, 0.21.

Cherries: sugar, 13.11; pectin and dextrin, 2.69; albumen, 0.9.

Strawberries: sugar, 7.57; pectin, 0.11; pectose, 0.9; albumen, 0.35.

Gooseberries: sugar, 6.2; dextrin, 0.7; albumen, 0.8.

Currants: sugar, 6.4; pectin, 0.1; pectose, 0.9; albumen, 0.5.

Raspberries: sugar, 4.7; pectin, 1.7; pectose, 0.5; albumen, 0.5.

Huckleberries: sugar, 5.7; pectin, 0.5; pectose, 0.2; albumen, 0.7.

Apricots: sugar, 11.6; dextrin, 4.8; albumen, 0.9.

Peaches: sugar, 6.6; pectin, 6; Albumen, 0.3.

Plums: sugar, 6.7; pectin, 6.4; pectose, 0.4; albumen, 0.3.

Figs: sugar, 62.5; dextrin, 5.2; fat, 0.9.

Dates: sugar, 58; pectin, 1.3; dextrin, 3.4.

Grapes: sugar, 13.7; pectin, 0.5; albumen, 0.8.

These figures are, of course, only approximately correct, varying with character of the soil, climate, and mode of culture. The right use of these and other fruits, in accordance with the requirements of an unperverted appetite, will be found to yield nearly all the necessary elements of nutrition, both nitrogenous and carbonaceous, and to largely replace the daily waste of solid matter in the system, amounting to about eighteen ounces.

Such nutrition, when all other conditions of health are observed, is perfect and genuine. It gives a pure, rich and fresh blood, which warms, without exciting by excessive heat; and since the temperature of the body is moderate, it is less sensitive to outside heat and cold, and less liable to be affected by contagious disease. A quiet and regular pulse of about sixty beats per minute indicates a mod-

erate waste of tissue, and promises in consequence a longer life. The foods that nature in its purity affords give to the internal organism its highest perfection, and to the muscles the greatest strength and power of endurance. The step becomes elastic, the form erect, the voice clear, and the whole appearance beautiful. The mind, too, is enlivened, the emotions purified, and the whole moral nature brought into harmony with Nature and her eternal truths. A true diet is thus the basis of moral as well as physical health, and from it as a starting-point must the race proceed to the realization of its ideal perfection. The greatest obstacle to this realization exists not in the world without. The foolish seek it there and charge their faults upon the order of Nature, of which they know so little. But its real existence is within us. It is uncontrolled appetite with the passions that it engenders. This is our great enemy; this the fiend that holds off the millennium. To subdue this cunning tempter that ever offers us unnatural food and to restore the appetite to that normal state in which only the good is desired, is to return

again to the paradise from which the lust of forbidden fruit has driven the race.

It is true indeed that this ideal cannot at once be realized by those who have inherited perverted tastes, and who up to mature life have indulged them; but we may keep a high ideal before us and advance toward it, and especially may we keep our children, from birth, in the right way; nay, more, we may so live that they shall enter upon life under more favorable conditions of organization than we did, and, beginning thus, may have scarce a thought but to obey their natural instincts; for these with the rightly born are pure and simple, demanding only such nourishment as is exactly suited to the maintenance of the body and mind in their highest condition. It has been our purpose thus far to show that this natural diet is found only in the various grain and fruit products, which flourish in all regions of the earth in which man can exist in a state admitting of development. If a dwarfish race, driven to the polar region, is compelled to subsist upon such animal flesh as it can secure, there is in this no justification of such a diet for those whose lot is cast in

lands abounding in nutritious grains and delicious fruits.

The Real Nature of Disease.—It is in the nature of every animal to seek to throw off whatever foreign substance may have been imposed upon it contrary to its natural requirements. But so long as only those elements of food, air, and water which it requires are conveyed to the body, the generation of diseased conditions is impossible. But as soon as any of the various unnatural foods or means of excitement which have been named are supplied to the system, not only the possibility, but the active cause, of disease exists. Immediately after taking alcoholic drinks there is a sense of intoxication, after tea or coffee an unnatural heat, and so on. When the senses are in good condition and the nerves sound, the action of every kind of food or drink upon the system may be detected by the sensations which they cause. Every enervating, exciting, intoxicating, heating, or other like action of a food or drink, affords unquestionable evidence that some disease-producing element has been introduced. The effort of the body to eliminate such materials is erroneously called disease.

In truth, however, the disease precedes all external manifestations, and the crisis called disease is simply the phenomena which accompanies the final effort at elimination, and the consequent restoration of normal conditions.

In this light it is apparent how false have been the theories which have sought to suppress this eliminating process by medicines, instead of removing its cause by prophylactic means—that is, by establishing normal and healthful conditions. The introduction of improper elements into the system is, in the view here taken, the real cause of disease, and it is no exaggeration to assert that in a hundred cases of disease, over ninety will be found to originate in the consumption of improper foods. When the entire body is saturated with impurities, the slightest cause may suffice to precipitate an inflammatory crisis. It is fortunate when such action takes place upon the skin, thus sparing the more vital organs, the lungs, stomach, etc. When these are attacked the remedial action is often delayed for years, and can only be perfected upon the simplest diet. A chronic affection may thus

require even ten years for its complete development.

One of the most frequent causes of a crisis is that of taking cold. This consists essentially in a suppression of the excretions of the skin, leading to various rheumatic and gouty affections of an acute or chronic character.

In a similar manner as by taking cold the crisis may be precipitated by a sudden shock or by pressure. A pressure upon any part of the body causes an increased circulation of blood in that part, and hence an increased secretion of impure matter, resulting, when pus is formed, in an eruption upon the skin, and this is nothing else than the act of nature in providing a channel for the escape of the offensive material. This remedial action is apparent after vaccination for smallpox, and sometimes also after the first eating of flesh or fat, through eruptions upon the head and hands, through sores or abscesses in the stomach or upon the skin, through sties upon the eyes, pimples upon the face, mouth, and other parts of the body, and in various other ways.

In like manner do other poisonous or diseased materials act upon the system. The

continuous use of beer and wine tends especially to produce hemorrhoids. Tea and coffee often causes affections of the heart, as, for instance, a hardening or deterioration of its substance. Tobacco and spices cause intestinal ulcers or inflammation of the stomach or of the mucus membrane of the intestines. The exact manner in which impurities are eliminated from the system depends upon the habits of life. A body which exercises freely in the open air excretes these foreign elements in a more natural way—through the skin, the kidneys, and the intestines; while the affections to which we have referred appear oftener with persons of a sedentary habit. From the above considerations, based upon experience and scientific observations, we derive the following physiological law of dietetics; namely: Every artificial change of the natural food, every unnatural method of nutrition, and every artificial drink, leads to some diseased condition of the system.

Great Value of Apples.—Of all fruits the apple takes the chief rank. One of its greatest advantages is its almost universal adaptation to all climates. It requires, also, no espe-

cially good soil, and in unfavorable weather yields a proportionably larger return for the attention bestowed upon it than any other fruit. Another great advantage of the apple is the ease with which it is preserved; indeed, in our Northern climate, it is almost the only fruit that can be kept throughout the winter. Of all fruits, too, it is the most nutritious, being the richest of all in sugar and albumen.

Apples should be stored in a dry and well-ventilated room, to which the sunlight is also admitted, and should be placed in layers, as loosely together as possible. It is also well to cover them with fine-cut straw. Where light is excluded, the air becomes impure, and the fruit, in consequence, is injured. By the careful observation of these suggestions, apples may be well preserved until the reappearance of berries and cherries in the spring; and this is, indeed, an important consideration with those who make fruits their leading articles of diet. The firmness and consistency of apples also enables them to be transported with less injury than most other fruits. With a few apples in the pocket one may make a

considerable journey, and no food is more suitable for excursions upon foot.

The juiciest apples are the most digestible, but the mealy sorts are nevertheless to be preferred, since they are more nutritious and more fully answer all the above-mentioned requirements. A good apple is digested in about one hour and a half, and, with wheat, constitutes the best possible food, and forms the most excellent bodily tissue. Rightly, then, is the apple regarded by vegetarians as the noblest of all foods. Its nutritive value is unquestionable. It does not, indeed, contain as high a percentage of the chemical elements of nutrition as wheat, but it supplies what the wheat lacks, and herein lies its greatest value. As wheat is the chief of grains, so is the apple the chief of fruits.

The most important elements found in the apple, and, indeed, also, in greater or less proportion, in all other fruits, are as follows: Sugar, malic acid, tannic acid, albumen, gluten, pectin, fibrin, starch, traces of free salts, and water, which latter constitutes three-fourths of the entire bulk. The skin, seeds, vegetable fiber and gluten constitute the solid parts.

The fibrin is, indeed, not completely digestible, but when the fruit is fully ripe it passes into a soluble condition. The specific weight of the apple is about .8—that is, considerably less than water—and there are about 15 per cent. of solids. The specific gravity of the solids when dry is 1.47.

The part of the apple nearest the skin has a finer and more aromatic taste and smell than the part immediately surrounding the core, which has often a more watery taste, and has also a less specific gravity, than the outer portion. The more solid apples, as the russet and Borsdorf varieties, are the most palatable and nutritious. While ripening, the fruit gives off carbon in the form of carbonic acid, and while it remains upon the tree it increases in solidity, since there is a constant flow of sap to it, and the fibrin increases, but the conditions are different where fruit ripens after it is plucked. In this case the proportion of fibrin and of water is less, while that of sugar is greater, so that such fruit is sweeter, but loses in freshness and fragrance.

The apple has not only the greatest number of varieties of all fruits—over twelve

hundred—but it is also the most widely diffused over the earth. It accompanies man everywhere except to the extreme polar region, nevertheless its true worth is seldom appreciated. In the country, apples and other fruits often constitute the almost exclusive food of children, but the inhabitants of cities often complain that they cannot relish them: that they cause flatulence, and that after eating much of them they observe a loss of physical strength. But all these symptoms only indicate a weakened or diseased stomach. In most cases it is warm food and stimulating drinks that have thus impaired the natural capacity for the digestion of fruits. In those families where much fruit is eaten, especially apples, the children, and indeed all who thus live, are distinguished by their healthy appearance, red cheeks, and cheerful temper; while those who eat little fruit, and whose food is that of our fashionable tables, are often quite the reverse in appearance and disposition. Although the nutritious qualities of apples differ somewhat with different varieties, they are all alike in their refreshing and enlivening qualities.

According to the well-known experiments of Dr. Beaumont with Alexis St. Martin, and from the actual experience of others, a ripe apple is digested by a healthy stomach in from one to one and a half hours. It does not, however, follow from this that after the lapse of this time it is necessary to eat again, but only that within this time the food passes into the form of blood and begins to nourish the body.

One experiences after eating apples rather an increase of muscular strength and capacity for work, as well as an elevation of spirits which, under a mixed diet, is often supplanted by feverish symptoms. Even after intentionally eating an excess of apples I have felt no disagreeable sensations.

Of the apples that grow upon a single tree the largest are the best. The color, as is known, is the evidence of ripeness, and the deeper the color of an apple the riper it is. Red apples should be very dark; the lighter sorts should have a soft, yellow tint; green apples have usually reddish spots when completely ripe. If a person has not been accustomed to eating apples, or cannot relish

them, he should begin moderately, taking only a morsel at first, and increasing gradually from day to day, until he can, without inconvenience, make an entire meal of them. Such a process may be called a gymnastic culture of the stomach. It is essential that apples should be well masticated and insalivated. Apples eaten without proper mastication not only fail to nourish, but cause disturbances, belching, diarrhea, etc. The apple should enter the stomach in the form of a completely masticated and insalivated pulp. Digestion then immediately commences. But apples should not be eaten as a dessert. They differ too widely in their nature from other food, and when so eaten are apt to cause flatulence or rumbling in the stomach. It is best to make each meal of not more than two articles, and for this purpose apples and wheat are the best, the latter being eaten in the form of brown bread.

The objection is often made to a fruit diet that it causes an overfilled and uncomfortable feeling in the stomach, without the real satisfaction of the appetite. But this, as already mentioned, results from the previous bad con-

dition of the stomach, not from the quality of the fruit food. Look at the usual mode of life of the factory laborer. He spends the entire day in impure air and subsists upon a diet of coffee, bad bread, beer or Schnapps, potatoes and bad meat. It is no wonder, then, that such a spoiled stomach cannot endure a fresh apple. Where the stomach has long been accustomed to a flesh diet, it may be necessary to introduce the fruit diet gradually, for otherwise the weakened organs are not in a condition to digest it properly. If fruit causes diarrhea, nausea, or other unfavorable symptoms, it is an evidence of a previously diseased condition of the system, the fruit being, not a cause of disease, but rather a means of bringing the disease out, and opening the way to a cure.

What has been said of the apple is not equally applicable to pears, which require greater care and a warmer climate for their perfect development. There are many coarse, woody varieties of pears, which are not to be recommended, and which are usually eaten cooked; but this is objectionable, since the real value is not thereby increased. It is also more

difficult to preserve pears than apples, and this gives to the latter a decided advantage.

Stone Fruits and Berries.—These are admirable articles of food. We have plums, prunes, peaches, aprieots, gooseberries, eurrants, strawberries, blackberries, and raspberries. These are of themselves sufficient to cure many diseases and to restore the system to its normal condition. A person suffering with fever often feels an intense desire for juicy fruits or berries, and with them cools the blood and calms the heated brain. The refreshing and life-giving juice of the fruit enters the blood, and passes as a messenger of health throughout the system. The severest cases of chronic disease may often be permanently cured by a fruit diet. Hemorrhoids, rheumatism, gout, scorbutus, serofula, and consumption, all of which have their origin chiefly in a fatty and diseased condition of the blood, are greatly relieved by this method of treatment. The ancients understood this subject, and banished lepers to the forest, where they were obliged to remain, until by a continuous diet of berries the blood was purified, and the disease thus removed.

The Strawberry.—Oh, thou modest yet beautiful strawberry! Like the violet, thou bloomest in secret. In thee lies concealed a joyous life, which thou art able to impart to man, and which he so much needs; but proudly and indifferently he passes thee by in thy humble retreat, seeking strength and health rather in the carcass of an ox—such is the folly of man.

The Grape.—If the apple is the king of fruits, the grape, the aristocrat of the garden, may well be called the queen. It flourishes only upon a good soil and in a warm or temperate climate, and is therefore attractive on account of its rarity, as well as its beauty and excellence. Its beneficial influence upon health is well known, and hence the so-called “grape cure;” but not only in sickness, but at all times, it is a most excellent food. The majority of people, we regret to say, prefer not to “take their wine in the form of pills.” Father Noah is described as the first one who employed the grape, after it had passed into decay, as a means of intoxication. This is, indeed, a great perversion of its proper use

and an evidence of the condition of human society.

Character as Affected by Stimulants.—The drinking habits of a people are an important indication of their character and degree of culture. Wine-drinking people are excitable and visionary—passionate in hate and in love, but without enduring energy. Beer-drinking people are lymphatic—slow to act and slow to think. Schnapps are the worst of all drinks. They eat into the stomach like a corroding ulcer, and destroy the life of a people. A nation given to the free drinking of Schnapps is incapable of any great intellectual achievement. The number of popular drinks is legion, and all, according to their character, exert a marked influence on the mental and physical, as also upon the moral and political, condition of a race. The influence of narcotics is not less marked than that of drinks. Tobacco, when chewed, has a brutalizing tendency; taken in the form of snuff it leads to uncleanness of habit; and when smoked, to a phlegmatic condition of body and mind. Opium is still more powerful in its effect. It not only intoxicates tem-

porarily, but permanently lowers the entire character of those who use it. With regard to water-drinkers, we find excesses among them also. There are those who pour water, as others do beer, by the quart, into the stomach. But we may disregard the excessive water-drinkers as a class, and only remark that those who have lived to be centenarians have, as a rule, avoided narcotics and spirituous liquors. It is easy to see how very beneficial and healthful in its moral and political influence would be the entire disuse of all artificial drinks and narcotics. The preparation of intoxicating drinks from the grape exercises a directly impoverishing influence upon the wine-producing countries, as recent statistics show with great certainty. This is Nature's revenge for the violation of her laws. More agreeable and refreshing than any intoxicating drink are the juices of acid fruits, to which water has been added, and their enjoyment leaves no sting behind.

The Huckleberry.—Of berries there now remains especially worthy of commendation only the huckleberry. No more delightful breakfast can be imagined than one of huckle-

berries and bread. The physiological action of all berries is essentially the same—purifying, opening, refreshing and strengthening.

Grain Foods.—There can be no doubt that the various grains, as well as fruits, were originally eaten by man in their natural and unecooked state. Even as late as the time of the Roman republic, the baking or other cooking of grain was regarded as injurious. When the grains are first broken, but not finely ground, they may be eaten in this way with fruit, if one gradually accustom himself to it. Let it not be said that this is going too far, for in the recognition and application of truth we cannot go too far; rather have those gone too far who have deviated from this method.

Pure cracked wheat is very nourishing. The difference between it and the usual bread is always considerable. The latter is only nourishing, but not at the same time enlivening—that is to say, it answers the place of nutrition, but does not increase the electrical vitality. The bread consumes in its digestion the power which it itself supplies, while the wheat not only nourishes, but,

like fresh fruit, increases the vital strength. As all fruits by the cooking process, so does wheat by baking, lose a portion of nutritive value, since the changed condition of the cells is united with a chemical change in the albuminous molecules. The correctness of this assertion is best substantiated by experiment. Fresh kernels of grain, eaten raw, and being only well husked, are exceedingly palatable and healthful. Nevertheless, the perverted mouth, taste, and stomach are not generally capable of taking raw grain foods—and this indeed is not necessary, since the manner of making coarse flour bread is at least not injurious to the grain.

Right Culture of Wheat.—If wheat is to maintain its full nutritive value, especial attention must be given to the manner of its culture. A good fertile soil, a good manure from which crude animal substances are excluded, and in general an intelligent mode of culture, are necessary. The kernels of grain, quite dry, should be shaken in a sieve to free them from dust, and then the imperfect grains should be removed, and the choicest only ground. The bran is an im-

portant part of the grain and should not be separated from it. When removed there is also a loss of gluten, which adheres to it. The natural office of the peculiar tissue of the bran is the promotion of the otherwise weak peristaltic action of the stomach and intestines, by which means digestion and a normal evacuation of the bowels is promoted. Over fourteen per cent. of the gluten adheres to the bran.*

Analysis of Wheat.—The external layers of wheat contain of oily matter, 1.42 per cent.; of phosphate of lime, .16 per cent.; which latter is an indispensable element of the bony tissue. An analysis of the whole grain shows the following constituents: Starch, over 65 per cent.—of which, however, about 5 per cent. is transformed into gum and sugar; gluten, 14 per cent.; phosphate of lime, .16 per cent.; fat, 1.42 per cent.; woody fiber, 8 per cent.; mineral matter, 1 per cent.; a little

* A process of removing the outside cuticle from wheat without removing the gluten is now coming into use in this country, apparently improving the flour. The Health Food Company, of New York, has given especial attention to this subject.—*Translator.*

common salt, and from 10 to 12 per cent. of water. The nutritive elements of wheat are thus very rich and abundant, and since it may, in case of need, be eaten in its natural state, unground and uncooked, we may well say that "*every kernel is a loaf.*"

Bread.—Bread made of the unbolted wheat flour is greatly superior to that made from the superfine, and when properly baked retains its nutritious properties for a longer time. Since the bran requires more thorough mastication and insalivation, it exerts a stimulating influence on the stomach and small intestinal glands, increases the secretion of the digestive fluids, and thus promotes the digestion of the gluten, gum, dextrin, albumen, etc. The whole wheat flour is prepared simply with water, thoroughly kneaded, then set to rise near the fire, and finally baked about two hours. Such bread properly made is, in union with fruit, the most delicious, healthful and nutritious of foods. It answers completely the purposes of nutrition. One is never surfeited with it. At every meal and at all seasons it is always the same.

Simplicity and Beauty of the Fruit and Bread Diet.—We thus have fruit and bread as articles of food which do not excite or depress, which do not weary or effeminate, and whose influence is wholly pure and normal. No repast can be more simple, natural and agreeable, none more healthful and beneficial after vigorous labor out of doors. A few cherries, plums, berries, grapes and apples and a little bread suffice to replace the used-up tissue. How pure and artistic, how in the highest degree humanizing, is such a meal. It brings us into harmony with nature and satisfies every want. Lightness of spirit, gentleness of disposition and an impulse to labor are the result; indeed this is the only food immediately after the eating of which we may apply ourselves to work or study without injury. Take, for example, a man who lives in the free air and in daily communion with Nature, who enjoys the blessings of willing labor, who eats of the juicy fruits of the garden, and drinks from the pure fountain, whose eye is clear and whose cheek is crimsoned by the blessed sunlight, and compare him with one who lives

in the foul air of some great factory and who subsists upon flesh and potatoes, beer and coffee. Look only at two such men standing as the representatives of two distinct systems of diet and of life, and say which system is to be preferred.

Nature's True Beverage.—The only perfect means of quenching thirst is water. Next to air it is the most essential element of life. It constitutes about eighty per cent. of our bodies. All the organs consume it, and the skin takes it up so eagerly that even thirst may be quenched by its absorption. It dissolves and carries away the humors of the blood, equalizes the circulation and causes the heart to beat uniformly and without excitement. Used in bathing, it stimulates the surface, and fortifies the system against colds. Water-drinkers have, of all men, the coolest judgment, and are the most alert, joyous, and enduring. High above all other drinks stands water, for,

“To the days of the aged it addeth length ;
To the might of the strong it addeth strength ;
It freshens the heart, it brightens the sight ;
’T is like quaffing a goblet of morning light.”

Air is Food.—As the light and heat of

the sun was necessary to the development of organic life on the globe, so the atmosphere is indispensable to its continuance, for it is an essential means of nourishing our bodies. From all parts of the circulation venous blood flows to the heart, loaded with worn-out, effete tissue and carbonic acid, and is incapable longer of maintaining life. The heart drives this spoiled blood to the open sea of air in the lungs. Here, in those delicate membranes surrounding the air cells, it meets the oxygen, which it at once absorbs. It is this oxygen which changes the blood to a bright red color, and imparts to it freshness and life. From this one sees how important it is to have pure air. Nothing is better calculated to undermine the health than breathing an impure, poisoned atmosphere, yet this must occur where the supply of fresh air is cut off. It is deeply to be regretted that the science of atmospheric dietetics is so ignored, even by our physicians and men of science. How often do we see them holding their scientific meetings in unventilated rooms. How often do their best remedies fail, when a simple and natural diet, with bathing

and fresh air, are alone sufficient to restore the sick one to health.

Fresh Air at Night.—Every one should take special care every day, and at all times, to provide fresh air in his rooms and to breathe it often from that limitless sea, out-of-doors; and not only must fresh air be furnished by day, but at night, also. There is an old and absurd superstition that night air is injurious; but I can testify, from fifteen years' experience, that sleeping with open windows is not injurious. Those persons, however, who excite their systems with hot foods and drinks, which weaken the skin and cause undue perspiration, will, as a matter of course, have colds and rheumatisms if they sleep by open windows. Those, however, who live on fruit and bread will find fresh air at night most agreeable and healthful. It may, however, be necessary to accustom one's self gradually to it, opening the windows a little at first, and then more and more, as may be found prudent by experience. It is shocking to see in what a disgusting atmosphere whole families remain the entire night, constantly breathing over and over again the gaseous emanations

of their own bodies. It is on account of this, especially, that we meet so many people in our large cities with pale faces and sunken cheeks. It is, also, an indisputable fact that inflammation of the throat may come from sleeping in unventilated rooms, and it is well known that it is best cured by fresh air and light. The popular expression that eating and drinking are the most important of the physiological functions is not true. More important than either is breathing. We may even regard fresh air as a plastic means of nourishment, like other food, from the fact that a night of sleep in a well-ventilated room, after a day of hard work, is so truly refreshing. The cause of this does not lie in the repose of the organs, but in the rebuilding of the tissues, and this could not take place without the oxygen, which is carried to all parts of the body. Six hours of sleep in a well-ventilated room is worth more than ten in an unventilated one. That so many become prematurely old is due to the fact that they do not derive sufficient electrical vitality from the air and from water and fruit.

How to Breathe.—It may be remarked in this connection that it makes a great differ-

ence how we breathe. It is hardly to be believed that among many thousands of persons we find so few who use their lungs as they should. On account of the peculiar structure of the body, natural breathing should take place through the nose, the inhalations should be deep, and the chest uncramped and held up-right. Many persons, however, breathe through the mouth. This is a serious violation of the true law of breathing. The nose has its walls covered with mucus, which helps to separate dust and other impurities from the air. Then, too, the sense of smell warns us of any poisonous substance that may be present. The air, too, is warmed in its passage through the nose. Breathing through the mouth may be the cause of various diseases, more especially of the teeth, throat and lungs, as has been shown by Mr. Catlin, in his remarkable work upon this subject.

Summary of Dietetic Laws.—We may now enumerate the principal laws that relate to physiological dietetics:

1. The food acts by virtue of its nourishing power and its refreshing qualities, its albumin-

ous products, its vital electricity, its salts, acids and oils, its water and bulk, its physiological purity, and its stimulating and solvent power.

2. Every change from natural foods and drinks to unnatural ones leads to diseased conditions.

3. The uninterrupted enjoyment of pure air and water, both of which are food, are essential conditions to the maintenance of health.

PART III.

DIETETIC ARGUMENT.

WE have now to consider the question of the practical adoption of the dietetic theories which have been advocated in the preceding pages. Are these theories better than those sanctioned by ages of usage, and, if so, is it now possible to stem the tide of popular prejudice, and to make of our faith a living reality? That the manner of life here proposed is, in truth, the best, we claim, simply upon the ground that it has been shown to be natural—that is, to be in harmony with physiological law—and it only remains to present its practical details, and to venture some suggestions as to the most prudent methods of its introduction. With regard to children, there is no difficulty whatever in the matter. Their appetites demand most eagerly

the glorious fruits that, above all else, are capable of imparting to their cheeks the rosy blush of health. If, directly after weaning, we give them crushed fruit and good bread, we shall retain their love for a pure and natural diet, and they will rarely desire any other food. After the growth of the teeth the child is nourished independently of the mother; and the larger and stronger these become, the easier and more agreeable it is to use solid food. A desire to chew hard substances now takes place, and this hint from nature must not be disregarded, if we would lay a good foundation for the future of the child. It is not necessary to feed it longer on pap, and all kinds of broth, as if it were still only a suckling.

How often we may observe in children, and know from our own experience, that they set aside cooked food, in order to gratify a desire to devour raw fruits or some appetizing root. In this way they practice the scientific diet instinctively. Only on such food, united with abundance of fresh air and out-of-door exercise, can healthy, rosy-cheeked children be raised:

sound in body and in mind, in understanding and in will.

If, in the case of adults, through custom or want of energy, a relapse from a natural diet is justifiable, there is no excuse for accustoming children to any unnatural food. It must be admitted that it is more difficult in the case of adults who have all their lives followed unnatural methods of living, and in their cases it is very necessary, for the first half year, of the new method, to only exclude flesh, tobacco, and intoxicating drinks.

The Best Season for Change.—A complete change to a natural diet can, however, only be made in the warm season of the year, for then one does not miss the heat and excitement which have been derived from the customary diet. The glorious sunshine fills and more than fills the place of a stimulating diet. Perhaps when cherries ripen is a more suitable season than any other. Both the morning and evening meal may be simply of cherries and bread, varied, as the season advances, with other fruits. The various grain foods in the form of pudding, with fruit sauce and without under-

ground vegetables, will make an abundant dinner, which may be eaten cold, even if cooked. The taste will soon be adapted to the change, and natural food only will be relished. Thus supported by all the enlivening influences of light and air, the whole system improves as if infused with a new life. The muddy complexion improves, the pimples depart, sores heal, and there is a pure, sweet taste in the mouth; the nose is freed from mucous secretions; and, in short, a new man is born. The advantages of this diet are so comprehensive, and the delight it gives is so great, that we willingly bid defiance to all those hindrances that obstruct its enjoyment. The first cold, wet day does not make us dull and heavy, for we have experienced the blessing of living in harmony with nature.

If we continue this manner of living, we shall scarcely feel the approach of winter, or shiver at the cold, as formerly. Should, however, the mid-day meal of fruits, grains, and nuts fail at first to satisfy, we have only to be patient, for this manner of life should not give pain, but joy and freedom. It may,

however, in such cases be well to return for a while at dinner to our ordinary food simply cooked, though there will be a loss of freshness, accompanied, it may be, by a feeling of satisfaction. But this comfortable feeling which one experiences after eating such food is inferior to the fresh, buoyant sensation after a natural meal. There is no cause of a relapse to the former diet but the want of an earnest will and energy. He only deserves freedom and life who gains it by the daily conquest of self. Without this victory nothing can be accomplished.

One never feels more vigorous, or more agreeably aroused, than when he makes a breakfast, on a bitter cold winter morning, of bread, apples, and a glass of water. With what ease, indeed—even with what a delightful feeling—the external cold is borne, and that by virtue of an inner freshness and power of endurance. When one does not succeed in adapting himself to a diet of fruit and bread, the cause is not in a deficiency of nourishment, but rather in the fact that an apple with bread requires a stronger stomach than the more easily assimilated milk and soft bread.

The first requisite in such cases is to regain a good constitution, and to this end a gradual change is much better than a sudden one. It is also essential to spend several hours daily in the fresh out-of-door air, and when the transition is not made too abruptly, not the least difficulty will be experienced. Even the muscular strength of those who do hard work will not diminish. In my own case I work several hours daily in my garden, and am perfectly satisfied with bread and apples.

Great pains must be taken to have a perfect bread. It must be thoroughly baked, neither too soft nor too hard, and capable of being cut into thin slices. The drinking-water must be clear and free from any taste except that which naturally belongs to it.

Advantages of the Fruit and Bread Diet.

The fruit and bread diet leads us to avoid unhealthful influences, such, for instance, as sitting for hours in a room saturated with the fumes of tobacco. The sleep, also, is more natural when the stomach is not overloaded, and hence the mouth is closed and the breathing is through the nostrils, as it should be.

In the morning we nimbly spring out of our beds at an early hour, and take a real delight in the invigorating bath with its accompanying friction. With what joy we ascend the mountain and cast ourselves on the bosom of mother nature. With what a delighted vision we behold the valley, the wilderness, the blue heavens above. How joyously we feel ourselves aroused by the breath of Nature, for we know we are in harmony with her, and with her laws. Emancipated from the shackles of an unnatural hyperculture, we regain a freedom which the soul has sought for thousands of years, but found neither in new systems of philosophy, nor in new forms of government; neither in dreamed-of ideals, nor in momentary pleasures.

Cost of this Diet.—The cost of the fruit and bread diet is less than any other. A strong man, doing hard work, may be well supported on it for one dollar a week, and, when fruit is abundant and cheap, for less. What a difference in price from other ways of living. A still more striking advantage lies in the entire independence it gives one of time and place and of the whims and caprices of others. This is especially the case when we journey, and would

hold ourselves unincumbered by all relations to meal-time. Fruit may be obtained almost everywhere, and bread may be carried with slight inconvenience.

The fruit and bread diet is in much more general use in Germany than many suppose; for, since it is the cheapest, there are in all great cities many workmen who are forced to use it. This may be observed in summer, when at night they may be seen coming home from work, eating fruit from the market. As, however, they eat white instead of brown bread, they are less benefited than they otherwise would be.

Emancipation of Woman.—With the bread and fruit diet comes the emancipation of woman. She will then no longer be a slave to the kitchen, for it will hardly exist. The time which she formerly devoted to so much cooking she will then devote to the wise education of her children, to garden work, and to her own culture.

Hints Concerning Eating.—There yet remain a few words to be said concerning eating and drinking. The appetite is best controlled and most normal when satisfied at regular

intervals. Many dietetic reformers eat but twice a day—at ten in the morning and at four or five in the afternoon—yet in my opinion three meals are preferable. If one arises in the morning between four and five o'clock, then a breakfast will be greatly enjoyed at about eight. Dinner, however, will be the chief meal, and is best eaten between twelve and one o'clock.

Under the old system of diet, the day is distinctly divided into two halves by the mid-day meal, a long pause and a time of dullness and rest being necessary, where the food so surfeits the system and taxes its vital energies; but all this has no application to the bread and fruit diet, which in no way unfits the body for continued exertion, and thus each day is a unit of labor and of health.

The best hour for the evening meal is between six and seven o'clock, and, if one would sleep sweetly and naturally, this meal should be light. The English custom of taking the chief meal between five and six o'clock in the evening is open to serious objections and is evidently unnatural. This appears from the following considerations: The cause of all organic life

on the planet, so far as we know, is the light, heat, and chemical force of the sun, and all vegetable and animal activity depends upon it. The greatest activity of the human body in all its functions is in the middle of the day. Man's power of work increases up to this hour; and since the demand for nourishment is greatest when the bodily and mental activity are at the highest point, digestion and assimilation being most perfect then, the most important meal should be at about this time. It is better to commence a meal with soft juicy fruits, and small bits of bread. The bread should not be heavy, but firm, light and good, so that mastication, which is a very agreeable process, may be complete. If the food is not perfectly prepared and thoroughly chewed, and insalivated before it is swallowed, digestion cannot be perfectly performed, and thus much, not only of the electrical vitality of the food, but also of its nourishing properties, is lost. A very important use of fruit is to restore to the tissues the fluids which have been lost by evaporation, exhalation and excretion. When a knife is used for cutting fruit, it should be made of silver, horn, or crystal. Steel

knives impart to fruit a disagreeable taste.

Position in Eating.—When one is not too weary, it is much better to take the food while standing or walking. This may at first thought seem unnatural, but in truth man is the only animal, or certainly the only one of the higher vertebrates, who habitually sits or reclines while eating, and there is no good reason why he should constitute an exception here more than in various other respects, which we have had occasion to point out. Where the food is natural, the method of preparing it, and the physical posture while eating it, may also well be natural. While eating fruit one does not experience the drowsiness that is induced by flesh foods, and there is therefore much less cause to sit. The usual position at table somewhat obstructs the circulation in the chest and abdomen, and this hinders digestion when it should be most active. It also admits of the stomach being overloaded much more readily and imperceptibly, the first sense of fullness being often experienced only upon rising. Those who sit at table should at least sit erect. The natural sensations will then more certainly indicate the proper quantity of food.

Sleep.—In the evening there is a relaxation of the system, which many persons seek to overcome by stimulation with tea, beer, wine, or tobacco, but a certain diminution of strength in the evening is a perfectly natural result of the labors of the day and of the absence of light. To prevent this relaxation by stimulation is unnatural, for the most important want of nature as the hours of night come on is rest. We should, then, retire early, and rise again early in the morning. By so doing the requirements of nature are kept, and the reward is health. It is one of Nature's open secrets that we must live in harmony with her arrangements, not only as to our food, but in all other respects, if we would prolong our lives. That old couplet,

“Early to bed and early to rise,
Makes a man healthy and wealthy and wise,

is well founded in science.

Adaptation to the Fruit and Bread Diet.
—When one first begins the fruit and bread diet, it often happens that he loses in flesh, and is troubled with gases in the stomach. This does not occur in perfectly healthy persons. In such instances, let no one be mislead by false

conclusions. This simply shows that the process of adaptation has not been perfected. Redness of the face, especially if it extends over the head and neck, is not always an evidence of high health; but, rather, of an enlargement of the arteries in their ramifications through the skin, often rendering them visible. At the same time the skin is apt to be wrinkled and rough. In perfect health the tint of the skin is clear and beautiful, and the cheeks have a natural and rosy glow. The pale, faded complexion so common is caused by unnatural nourishment and insufficient æration of the blood. In order to guard against the paleness of face unjustifiably charged to a fruit a bread diet, it is advised that diligent exercise be taken, out of doors; especially in the woods, or by mountain climbings; and where this is not practicable, by work in the garden, or gymnastic exercises. The transition to this diet is more easily made when abundant exercise is taken, and the depression which sometimes comes from it is largely prevented by this means. It may be that at first there will be experienced a certain longing after fatty foods. In such cases soft

bread, nuts and almonds, will give more lasting satisfaction than it is possible to obtain from animal fat. That craving for excitement which animal food gives has its origin principally in deficient exercise, or a long-continued, one sided activity, which is to be counteracted by such out-door exercises as have been mentioned. The gastric juice changes somewhat with a change of food. Fats and flesh impair its natural qualities. The fibers of the stomach are weakened, and the digestive fluids so changed, that an apple is not easily dissolved. If one, however, makes the change gradually, and continues the natural food patiently, the digestive fluids return to their natural strength, and the walls of the stomach become once more accustomed to the presence of raw fruit, so that it is easily digested. The system then takes on flesh, and the cheeks become full and rosy, as they ought to be in a normal condition. At first one misses the stimulus of heat that is carried from the stomach to every part of the body, but I can testify from my own experience that if the change to a cooling diet is made in summer this loss of excitement

is easily and willingly borne, and after a short time a more agreeable and refreshing feeling is experienced on a fruit and bread than on a mixed diet. The excessive perspiration which is caused by hot foods, and which so weakens the system, disappears, and as soon as we become accustomed to the change we do not in the least miss the stimulus of unnatural food.

Quantity of Food.—Closely related to the questions we have been discussing is another of very great importance in the establishment of a scientific diet. This relates to the quantity of food necessary to the maintenance of perfect health, and here as elsewhere an unperturbed appetite is the best guide. Especially is this true with those who have continued the fruit and bread diet for a long time. Most people eat more than they require, and, the worst of it is, this excess acts injuriously by its quantity more than by its quality. It may however be said in favor of the fruit and bread diet, that it never acts injuriously by its quality, and in excess is less injurious than any other. An overloaded stomach causes, first of all, discomfort and ill-humor, while a

joyous feeling is maintained in no way so well as by moderate eating. An instinctive feeling should always tell us when we have eaten enough. If we eat more, this voice of nature becomes silenced, and we may go on stuffing at the expense of health.

Change of Diet.—Is it necessary that we should occasionally change our diet, as chemistry claims to teach us? Evidently, not further than the seasons indicate, by constantly presenting to us new fruits and grains, unless our food is so illy adapted to our wants that it does not thoroughly nourish our bodies. In wheat, according to analysis, we have the most perfect grain food. But we must not forget that it is a one-sided view of this subject to take into account only the amount of nourishment a food may contain, and leave unconsidered its power to impart elasticity and buoyancy of feeling. This latter is obtained abundantly from fruit, which, according to chemistry, is much poorer in nourishment than wheat.

Those who would live upon the least possible variety of food should choose apples and wheat. In these are found all the elements

necessary to the support of the body. I have myself lived for months at a time on fruits alone, and these in no great variety, and have upon this diet experienced no loss of strength, while there has been an evident increase of the electrical vitality of the system. If I were compelled to choose a single article of food upon which to subsist exclusively, I should at once select the Reinette apple, which is peculiarly rich in nutritive elements. There are well-authenticated instances of persons subsisting for a long time, either from choice or necessity, upon a single article of food. In one case apples constituted the almost exclusive food of a farmer for forty years, the health and strength being preserved in the highest degree.

A certain variety of food is, however, to be recommended. But at a single meal variety is neither necessary, nor, to the normal appetite, agreeable. The fewer the number of dishes the sooner the appetite is satisfied, while too great a variety acts as an improper stimulant. It is a flagrant violation of natural law to indulge in course after course of wholly different foods, in the manner seen at our fash-

ionable tables. Such excesses lead only to gluttony and disease.

I may mention in this connection an existing prejudice against eating fruit and drinking water at the same meal. This feeling has no justification in fact, and, indeed, one of the best tests of a sound condition of the digestive organs is the ability to receive uncooked fruit and cold water at the same time. Only a weak stomach will refuse them.

Unripe Fruit.—In regard to eating fruit before it is perfectly ripe, it may be said that an unperturbed instinct is our best guide. A fruit is best when it is most agreeable to a healthy palate. Unripe fruit contains more acid, and ripe fruit more sugar. An excess of acid is neither healthful nor agreeable. It is very natural that unripe fruit should cause congestion in weak stomachs, yet children in the country who have been accustomed to eating fruits, and whose instincts do not go far astray, sometimes crave unripe fruits, and are not, apparently, injured by them, though city children going to the country have to be very cautious in this respect.

Mastication.—"Food well chewed," says an old proverb, "is half digested." This is especially the case with fruit and bread. When not well chewed and mixed with saliva it distresses the stomach, and its nourishing qualities cannot be appropriated. The muscles suffer, there is a loss of strength and courage, with paleness of the face and emaciation. A careful investigation will always reveal the fact that these appearances have their origin, not in the food, but in the way of taking it. Poverty of blood, common in this age, has a chief cause in rapid eating. Those, therefore, with whom the fruit and bread diet disagrees, should not at once lay the blame to it, for the real cause may lie in the manner of eating and in imperfect insalivation, unless, as before stated, the stomach has previously been ruined, in which case it must be made normal by wise measures. A thorough preparation of the food in the mouth adds to its flavor, and gives a more immediate supply of nourishment. The general demand for the artificial stimulation of beer, wine, tobacco, tea and coffee, is caused partly by an overloaded stomach; but when the food is well masticated

this craving is seldom felt. Imperfect mastication is also the frequent cause of acidity of the stomach.

Hints on Drinking.—With reference to drinking, little can be said that the thoughtful man does not already know. Let one drink only when thirsty, regardless of the hour or the season of the year. Let the temperature of the water be such as is most natural and agreeable—neither too cold nor too warm. When overheated, but little cold water should be taken, on account of the injurious effects it may have upon the stomach, heart, lungs and brain. It may not so seriously injure a healthy person, still it is always better to rest a little and cool off the hands and face, after a march or run, before drinking. On marches and long walks the proper quantity of pure water is enlivening, and promotes endurance.

Changes Must be Gradual.—When it is impossible to continue the fruit and bread diet throughout the year, or when the constitution is such that this is not admissible, which is rarely the case, it may at least be adopted to advantage during the summer and autumn months, in order to give the system an oppor-

tunity to cast out its old refuse matter, and accumulate fresh and healthy blood. In general, those with weakened constitutions are advised to regard the fruit and bread diet as an ideal, and to strive as far as possible to carry it out. The conditions of modern society render it difficult at times to live in a natural manner, but we may, if both the theory and the will are right, gradually approach the true standard.

The Excrement.—The exceedingly offensive character of the human excrement, so different from that of the lower animals, may fairly be regarded as an indication that human food is not in accordance with physiological law; and this *prima-facie* evidence is strikingly confirmed by the fact that the excrement of persons living upon a purely vegetable diet, consisting largely of fruits, is far less offensive than that of the same persons when eating flesh with its usual accompaniments. Animals in a state of nature, subsisting upon their own chosen foods, are capable of fully digesting the nutritive elements, leaving only an inoffensive residue, while the unsuitable character of human foods is sufficiently indicated by the horrible

and disease-breeding product which they yield.

It is not strange that fastidious writers on medicine, who investigate every other subject, turn away from the examination of so repulsive a material with disgust, or with only the slightest mention. But it is not a matter of indifference whether a disagreeable odor is given off with the breath, and whether the exhalations from the skin are full of bad-smelling substances. Nor is it a matter of indifference whether the excrement is foul, for it is only an index of what our food and its transformations have been. The last process of digestion takes place in the duodenum, and leaves only a weak acid odor, and this should be the only smell given off from human excrement. This is the case when the diet consists of fruit and bread, but the slightest change from this may at once be observed in the feces? If the food is not thoroughly masticated, a bad smell in the excrement is one of the results, and this should teach us the importance of attending to apparently trifling matters. The subject here treated is instructive, if not agreeable, and cannot be omitted from a full discussion of

dietetic questions. It certainly affords direct evidence in favor of the fruit and bread diet.

Evidence from Photography.—We have in photography an excellent means of determining the condition of the blood. According to its quality, the blood deposits more or less impure material in all the cellular tissues. Such deposits occur also in the sebaceous glands of the skin, which secrete a natural fat and deposit it in the mucus layer between the true skin and epidermis. Although the color of the mucus layer is visible through the epidermis, its finer shades are not seen in this manner, yet they appear in the photographic negative with such sharpness that the slightest impurities are here apparent as dark specks.

This phenomena is due to what may be called the photography of the invisible—that is, to that remarkable property of light by virtue of which the chemical action of color rays falling upon the plate varies with the rapidity of their transmission to it. It is interesting to observe the accuracy with which the condition of the skin is thus shown, varying as the shade upon the plate does, from the utmost delicacy and purity to a peculiar seive-like character—

that is, appearing as if punctured with innumerable little holes; these in the worst cases being irregularly united, so as to present a more or less ragged and unsightly appearance. After a person has taken milk, fat, beer, flesh, tobacco and other like injurious substances into the system, even for a little time, the negative exhibits this punctured appearance; while in the case of those whose manner of life is wholly corrupt, these defects are often magnified into such blotches as are seen upon the face itself in skin diseases.

Complete Reform.—It is true that those previously accustomed to a flesh diet, and whose general habits of life have also been bad, will find an immediate and complete change difficult. To this there is necessary a moral as well as a physical element, and the change undertaken should therefore by no means be limited to the single matter of food. Let a person convinced of the importance of dietetic reform undertake with it every other needed improvement. Let him rise early in the morning and retire early at night. Let him devote the morning hours to mental culture, the mid-day to business or physical labor, and the

evening to innocent recreation. Let him breathe, both day and night, pure air, for this alone is the real "breath of life." Let him bathe in pure water, in the pure æthereal ocean too, and in the glorious sunlight.

In the process of change diligent outdoor labor is especially to be recommended. The heat of the body being thus maintained in a perfectly natural manner, there is much less of that craving for artificial stimulants which is especially generated by a life of indolence or by laboring in the confined and impure air of factories. There are whole classes of workmen who are notorious for their injurious drinking habits, and who attribute their unnatural thirst to the state of the air in their overcrowded and ill-ventilated workshops. For such persons a reformation in diet would be scarcely possible unless that other element of their food, the air—for air is really food—could also be purified. The much vaunted "dignity of labor" does not exist where all the attendant conditions are physically injurious. A food reformation, however good in itself, is therefore of little significance without a complete elevation of life and character.

The objection often made to a simple diet, that it requires the sacrifice of appetite and of social pleasures, has no justification in fact. He who returns to nature returns to the sweetest enjoyment. The sense of taste is rendered much more acute by eating only of natural and unseasoned food, and the pleasure experienced in eating is thus greatly increased. One whose food is thus pure is able, for example, to determine from the flavor of an apple whether it has been grown upon a fertile or a poor soil. Injurious substances in food are quickly detected. Thus while the taste is keenly alive to agreeable sensations, it experiences no longing for those unnatural stimulants or pleasures which reason has rejected. To it the simple fruits of the garden are most delicious as they come from the hand of nature, while beer and tobacco, flesh and condiments, are disagreeable, and often even disgusting. It requires, therefore, no effort of self-control to restrain the purified appetite from unhealthy foods, however tempting they may seem to others. Those who have, happily, learned the better way are unconscious of having made any real sacrifice, but rather feel that both the appetite and the

means of its enjoyment have been greatly improved by the change.

But the improvement does not stop here. The purification of the physical system most naturally leads to the improvement of the intellectual and moral, and thus a reform commencing with the lowest of the appetites and passions is carried up through all the faculties, and made to include the entire man. When thus complete there can be no thought of a return to a lower plane of life, or to those disease-producing foods that have been so willingly rejected. Only a diseased stomach demands unhealthy food. In the adoption of a natural diet, the necessity of caution is greatest in the case of adults and of invalids. Young people in good health may make the change at once and completely, though it may be well to precede it with a day of fasting. The empty stomach will then the more readily accept the new food, and no precaution is necessary but that against over-eating. It does indeed sometimes happen that the change is attended for a little time by irruptions upon the skin; but this is not an unfavorable symptom. It is only the necessary

result of the increased vital action of the system, which removes impurities in this manner. No treatment is necessary in such cases further than that of a proper regulation of the food and drink: A steady continuance in a right course of living will result in a rare purity and clearness of the skin.

A similar excretory process through the skin takes place often at the beginning of winter; the bracing atmosphere of the season causing increased activity of the vital forces, and the consequent elimination of impurities in this manner. This, however, is often attributed to a lack of nourishment, though the existence of these impurities is more often due to the excessive richness of the food. Still another cause of these cutaneous eruptions may exist in the impurities which those who try to live naturally are compelled to take into the system when their chosen food cannot be obtained. The delicacy of the sensations causes a rapid elimination of the injurious material thus introduced into the blood. The best treatment in such cases, and indeed of all affections of a similar nature, is by the local application

of cold-water compresses, and by increased attention to diet and out-door exercise. No other treatment is necessary in such cases. The objections urged against natural diet are very numerous, and relate especially to the seeming aversion of the stomach to simple and unstimulating food; yet I have known many, and especially young people, to adopt it with enthusiasm, and with complete success; and it is here worthy of note that those who have most readily adapted themselves to it, and who have derived the most advantage from it, have been persons of previous good habits, and of moral tendencies. There seems, indeed, to be necessary to it a certain simplicity and purity of character. In not a few cases I have learned that persons whose habits of life have long been corrupt, and especially those who have been sexually diseased, find it very difficult to exchange their stimulating diet for a simple and natural one. That such persons might be permanently cured by the change may well be believed, yet it is at first peculiarly uncongenial to their acquired tastes, their complaint being that cool unstimulating food "does not agree with the stomach."

The true test of a proposed system of diet is, however, its adaptation to the requirements of those who are sound and healthy. Such will in no case find the food which nature has designed for man otherwise than agreeable and strengthening; and one whose system has been corrupted, and whose appetite has been perverted by evil habits, will find such foods agreeable just in proportion as the system is cleansed, and the whole life improved. Where an invalid has the will to adopt and adhere to a pure and natural diet, the adaptation to it will be certain, even if gradual.

Improvement commences with the digestive system. The appetite becomes normal and the action of the bowels regular. The pulse becomes less rapid, and the nervous system calm. Thus all the vital forces are relieved, and whatever impurities may exist in the system are eliminated by nature's own processes. When the normal functions are thus restored, and the obstacles to their healthful activity removed, the cure of disease is complete, and the resulting condition is that of health. And this is all there is of a true remedial system. Nature alone cures. The physician has but to

see' that no obstacles are thrown in her way, and that the elements which her processes require are furnished; and these are so simple, so in harmony with the natural instincts, that the wisdom of a child is sufficient to find and to use them; for what but freedom does a child require in order that it may dwell in the sunlight, and drink at the fountain, and pluck the ripe fruit as its food.

Conclusion.—The study which we have here made of the human system, and the facts of experience which have been presented, have led to the conclusion that fruit and grain food constitute the true scientific diet of man, and thus is answered the great question: "What shall we eat?" Strange indeed it is that there should ever have been so much controversy regarding it; for that man's original organization was best adapted to this food is clear, and that his remote progenitors were frugivorous in their habits is generally conceded by physiologists; and, since the physical organization has not changed, it follows with certainty that the food properly remains the same; for man is not independent of nature. He is, with all his faculties and capabilities, in all that re-

lates to his race and individual development, but one member in the great unity of animate nature. The laws of organic life apply to him as well as to every other living creature, and by no arbitrary will or act of his can they be set aside.

In determining these laws we are greatly aided by our natural instincts, the expression of which is found in many beautiful and poetic customs. The ear of wheat has ever been regarded as the emblem of industry, and the apple as the emblem of love. The artist embodies his ideal of humanity in a figure holding a basket of fruit and flowers. Ceres, the goddess of agriculture, is represented as the tamer of wild passions, and as the loving mother who would lead her children back to simplicity and purity of life. What Ceres was in Roman mythology, Iduma was in the Northern—she was the protectress of the apple, the food by which the gods preserved their immortality.

In the religious observances of the German people this sentiment appears in a beautiful form. The apples that adorn the Christmas tree are held to symbolize the infinite love

of God in giving his only son for the redemption of man.

There is no more delightful festal day in the farmer's home than that which celebrates the gathering of the fruit, for it brings with it health, wealth and contentment. On this joyous occasion, the tables are spread with the choicest fruits of the season. On each vase lie in profusion swelling grapes, luscious plums and peaches, deliciously sweet pears, and rosy-cheeked apples. How the joyous flock of healthy children look with longing eyes on the beautiful sight. Life-renewing, life-preserving, is the delicious nectar which flows into the blood, and to the hearts of these pure creatures. Happy the lot of those who thus live in the sunlight, and breathe the air of the forest and the field, and gather their food from the soil. They alone are the true children of Nature. Upon their brows she sets her seal, and in their speaking eyes is revealed a harmony with all her laws.

The following is a brief synopsis of what has been said in these pages:

1. According to the results of scientific

study, man is by nature frugivorous, and this is in harmony with his instincts and feelings. Any departure from this must prove injurious to the health and to the mental and moral nature.

2. Climate and surroundings cannot change the nature of man with regard to food.

3. The use of flesh-food has a corrupting influence on the body, is distasteful to the sensitive nature, and in causing the death of the animal is immoral, for the work of the butcher is inhuman and barbarous.

4. There is no further necessity of continuing a flesh diet in middle Europe or America, as we can from our present supply of fruits, nuts and grains, live on bread and fruit for at least nine months of the year, and by proper care may extend this time to fully twelve months.

5. The wise adoption of the fruit and bread diet would ultimately result in a great physical and social benefit to mankind.

6. The only excuse for using flesh is a scarcity of other food.

The scientific diet, therefore, which answers all the requirements of nature, being in beautiful harmony with her laws, and which I once more recommend to the reader is,

FRUIT AND BREAD.

GERMAN AND ENGLISH WORKS QUOTED BY THE AUTHOR.

1. R. Virchow. Lecture upon Foods. From the Collection of Popular Scientific Lectures, published by Virchow & Holzendorf, Berlin.

2. Thomas Huxley. Man's Place in Nature.

3. Carl Gegenbauer. Outlines of Comp. Anatomy.

4. Ernst Hæckel. On the Origin and Descent of the Human Race. Two Lectures, 1868.

5. A. E. Brehm. Animal Life Illustrated. [Of all similar works, this is the most scientific and valuable.]

6. Ernst Hæckel. Anthropogeny ; or, History of the Development of Man. Popular Scientific Lectures.

7. Thomas Huxley. An Introduction to the Classification of Animals.

8. Carl Vogt. Lectures upon Man: His Place in the History of the Earth.

9. Charles Darwin. The Descent of Man, and Sexual Selection.

10. Ernst Hæckel. General Outlines of Organic Morphology. 2 vols. Vol. I. General Anatomy of Organisms, or Science of the Development of Organic Forms. Vol. II. General History of the Development of Organisms.

11. August Schleicher. The Darwinian Theory, and Philology.

12. Moritz Wagner. The Darwinian Theory, and the Migration of Organisms.

13. Thomas Huxley. Outlines of Physiology.

14. Leonhard Baltzer. The Food of Man in its Chemical Composition and Physiological Significance.

15. Theodore Hahn. Handbook of Hygienic Treatment.

16. Edward Reich. Medical Essays. 2 vols. [This excellent writer and physician explains the causes of prevalent physical and social diseases upon purely anthropological principles.]

APPENDIX.

A LETTER FROM DR. JAMES C. JACKSON.*

My Dear Dr. Holbrook:

I am now sixty-six years old. Until I was thirty-six, my habits of life were such as were common to the people of my day and station. I knew nothing of the laws of life and health; I ate, drank, dressed, worked, played, rested, slept, and did as was the fashion of my day. Early in life I became ill, owing, as I now think, very much to errors in diet; but I did not then know, nor did my father, who was an old-school physician of high standing, know, that my ill health arose from dietetic errors. He contended against it from the side of administrative medicine, but I grew worse; and before I came to puberty it was said by the best physicians of that time that I had organic disease of the heart, and could not live long.

I do not know how many diseases the two hundred physicians I have had employed for me, or employed for myself, declared I had, each one of which tried his best by medicines to cure me. During the last twenty years of this period of my life, I have no recollection of ever

* Dr. Jackson is, and for many years has been, physician-in-chief to "Our Home" Hygienic Institution, located at Dansville, Livingston County, New York, one of the largest institutions of its kind in the United States.

having passed a day without taking some medicine prescribed for me by some physician. The autumn before I came to be thirty-six years of age, I was taken sick away from home, and was in the hands of a physician all winter, who had the good sense not to give me any medicine, saying, it was of no use to me, because, in his judgment, I could never get well. I lingered in great suffering until spring, when, bolstered up with pillows, I was carried from my friend's house to my own, never expecting to leave it again; when, incidentally, I heard of what was then called The Water Cure Treatment. I knew nothing about it, had no faith in it; but such stories were told of it as to interest me and interest my family and friends to investigate it; the result of which research was, that I went to a Hydropathic establishment for treatment.

The physician of the institution was a graduate of an Allopathic medical college, believed in giving medicine to his patients, knew little or nothing more than any other physician of his day about the laws of life and health, and paid little attention to diet while I was under his care. As all of my other physicians had done before, he pronounced me incurable, and preferred that I should not remain, but consented to my earnest appeals, and so I spent the summer with him.

While I lay one night upon my bed tossing with pain, an impression came to me that there was one thing which I had not tried from which I might receive benefit. The impression was, that I should change my manner of life, and it took hold of me with such force that I felt impelled to state it to my doctor, which I did; and while he thought nothing could come of it, he was willing I should make the experiment. So I began a revolution in my habits of living. I made a tabulated statement of my habits as far as I could call them up in order; and when I had gone through the whole list, I examined them carefully to see if my experience in the past as an invalid could furnish me any light upon the subject

of the effect of such habits upon my health. I was compelled to recognize the fact that quite a large proportion of them might just as well be dispensed with as not; that in no way could I possibly be any worse, and I might be much better; and so where I thought I could make changes without injury, I crossed them out from my list, and cut down the whole one-half at one sitting. After I had done this I was surprised to see to what extent I had invaded those indulgences which were connected with my food and drink; or if not directly, were sympathetically, related. This led me to a very serious thought, wherein I was forced to argue the question of food and its uses in its relation to health and disease from what was to *me* an original standpoint. The consequence was, that during that season, I came to the conclusion that if I could live, it must be through a very radical change in foods and drinks; *that I, at least, needed food which was nutritious, but non-stimulating rather than its opposite.* To know, therefore, what food to use and what to avoid, I had but to recollect how certain articles had always affected me. If I ate bread and milk, I felt no immediate increase of strength; but if I ate largely of beef steak or roast beef, within ten minutes I felt very much strengthened. If I drank cold water, it did not seem to add to my available nervous vigor; but if I drank strong tea or coffee it did. If I ate food so concocted that there were in it no spices nor common salt, it affected me immediately much less in the development of nervous force than if I ate the same kinds of food exactly having plenty of spice or of salt in them. So I ran through the whole list of foods to which I had been accustomed, and in which I had liberally indulged, and drew a line of separation between those which furnished at length a certain amount of nutrition and so of strength, and those which seem to furnish an immediate increment of strength. The latter I discarded, the former I adopted and used. I knew I was assuming a serious responsibility in doing this, but I felt at liberty

to do it, because my doctors had all given me up to die; and when a man has sentence passed upon him and is awaiting execution, he need not consider very seriously in what light public opinion regards his actions.

Under the changes which I made I suffered physically; I lost flesh, and grew feeble in physical strength; nevertheless I had my compensations in a very great mitigation of some of my bodily maladies, and I took on better mental and emotional conditions. I slept better, could look out upon men and things through the loophole of my retreat with a more patient, philosophic, and less despairing eye. I found that my affection for my family and my interest in the general welfare of my fellow-men were increasing, and I said, as Nature does really her best in all her ministrations unto men to render equivalents, how do I know that in depriving myself of the accustomed stimulations in my food and drink, and so suffering loss in weight and strength thereby, I am not to more than make it good in gain of nervous energy? There came to me an idea then which I have never lost sight of, that many diseases which put on a nervous type originate in abrasion of the nerve tissue and consequent depreciation of nervous power. So I argued that possibly the incapacity of my stomach to digest food, of my bowels properly to defecate their contents, of my heart to beat rhythmically and symmetrically, of my brain to furnish my mental faculties with force to act profitably, might be owing to my having used such food and drinks as had not made my nerve tissue good as against the waste to which, under my conditions of living, it had been subjected. If this was so, then I needed not to die, but only needed time to build, and so I followed out my thought and discarded all flesh meats, all stimulating drinks, all stimulo-narcotic beverages, all condiments of every kind (unless sugar be considered a condiment), and lived for twenty-three years on grains, fruits and vegetables, simply cooked, without any deviation. I ate no flesh of animals;

I used no milk, nor butter, nor salt, nor spices; and nearly every disease which had cursed me through life, spoiling my childhood, embittering my young manhood, and ruining me for anything like earnest endeavor in my maturer years, passed away, and I came to be free from all ailments except two, both of which were organic—one a disease of the heart and the other a disease of the kidneys.

About this time an incident occurred which somewhat changed my habits of diet for a whole year. I was paralyzed by an accident, and my kidneys refused to perform their duty. I had an accident insurance policy which entitled me to a stipend while I was incompetent to attend to business. The physician of the company, upon report of my incapacity being made to him, visited me. He found me in a very dangerous state. There had not been as much secretion of urine in the fortnight between the time of my accident and his visiting me as an ordinarily healthy man would make at one flow. It was understood that unless the kidneys could be made to act I must die.

Knowing, as he did, my utter disinclination to take medicine, he said to me : " Having been so long without any stimulating food, it might be that were you to eat plentifully of meat for a while, the kidneys would be so affected as to resume their functions." I replied : " I have no scruples against eating meat, except on the ground that its use in my early life, I am satisfied, did me a great deal of harm. If you think it will be well for me to try it, I will." He said he thought it would, and so I tried it. The effect of a meal of mutton was wonderful. In less than three hours after I had eaten it I passed more than three pints of urine. I then went on eating it for three or four days, when, all at once, my kidneys refused to act under its use. I went back to my old diet for a month, eating very sparingly and very simply of grains and fruits, and then tried meat again. It produced the same effect upon me for a few days,

with the same relapse. I tried it in this way for nearly a year, and then discontinued its use altogether.

Just about this time I had a severe attack of dyspepsia. I attributed it largely to the disturbance caused in my sympathetic nervous system and brain by my very moderate use of meat. My family was desirous that I should go to Europe for my health. I was full of business, with large responsibilities on my hands, and I declined to entertain the idea. I went to bed one night, and in the morning I arose, told my wife I had been to Europe and got home again. She laughed and wanted to know what I meant. I said: "I have become convinced that I eat too frequently." I had then been eating, for twenty-three years or more, only twice a day. I said: "Now I can do better on one meal a day than I can on two; I can digest it better, it will tax my nervous system less, I shall feel better, sleep better, and be stronger." She and my children seriously objected to it, but I said, "Let me try it." So I had myself accurately weighed, and just four weeks from that day I was weighed again and found I had gained eight pounds. I kept on gaining until I went from 134 to 143½, which was within eight ounces of as much as I ever weighed in my life. I have lived since that time on what may be called an anti-flesh diet, once in a great while using fish, when I have been so situated that I had to eat it or go without food. I think it will be accorded to me that I have done as much work, of both brain and body, as any man in my region of the country. For all the wealth of India I would not resume the dietetic habits of the first half of my life.

Beneficial, however, as has been my strictly farinaceous, fruit and vegetable food upon my physical and bodily health, and gratifying to me as my improvement in this respect has been, I count it but small compared with the increased intellectual and moral efficiency which has resulted therefrom. More than this, I declare that my spiritual faculties have been wonderfully energized; that I have grown into a better, truer, and more

advanced knowledge of Christ and of the wants of humanity. I appreciate principles and forces, motives and plans for the amelioration of my fellow-men vastly better than when I lived under the old *regime*. I keep my passions, propensities, and appetites within my own handling. Every quality of my nature relates itself to normal expression much more readily and effectually ; and I do most heartily commend abstinence from the flesh of animals as food to every human creature under the sun who wishes to put away from himself the lusts of the flesh and put on the graces of the Spirit.

During these years I have been able, under God's good providence, to give back health and strength and hope and heart and home to very many of my fellows, who, like myself, had been living in the gall of bitterness and the bonds of iniquity, by inducing them to forego substantially the use of the flesh of animals as their staple food. I am sure that there is a divine philosophy underlying the question how men shall eat and how they shall drink, and that it is very desirable to all who would rise to a higher plane of consciousness that they should do as I have tried to do—to eat and to drink to the glory of God.

A CURE FOR INTEMPERANCE.

A Paper read by Mr. Charles O. Groom Napier, F. G. S., Member of the Anthropological Institute, etc., etc., before sub-Section D (Physiology) of the British Association, at Bristol, England.

MORE than twenty years ago I read in Liebig's "Animal Chemistry" (translated by Gregory, page 97) how the use of cod-liver oil had a tendency to promote the disinclination for the use of wine, and how most people, according to Liebig, find that they can take wine with animal food, but not with farinaceous or amylaceous food. I was at that time a vegetarian, and felt in my own person the truth of this statement of Liebig, as also two members of my own family, one in old age, and another in middle life. They had for two years adopted the vegetarian diet, although brought up in the moderate use of alcoholic liquors, for which, after becoming vegetarians, they felt no inclination. I was induced by this seeming proof of the accuracy of Liebig's theory to endeavor to find whether it might not be valuable for the cure of intemperance. Having applied it successfully to twenty-seven cases, I will briefly give the results :

1. A military officer, 61 years old, of an aristocratic Scottish family, had contracted habits of intemperate whisky drinking while on service with his regiment in

India, but was well satisfied with himself, although a torment to his wife and children. His habit was to eat scarcely any bread, fat, or vegetables. His breakfast was mostly salt fish and a little bread. His dinner consisted of joint, and very little else. He consumed during the day from a pint to a quart of whisky, and was scarcely sober more than half his time. His face and neck were very red. By my advice his wife induced him to return to the oatmeal porridge breakfast on which he had been brought up, and to adopt a dinner of which boiled haricot beans or peas formed an important ingredient. He did not like this change at first, and complained that he could not enjoy his whisky as much as formerly. About this time there was a great panic among flesh-eaters in consequence of the cattle plague, and his wife became so alarmed that the whole family was put on a vegetarian diet. The husband grumbled very much at first. But his taste for whisky entirely disappeared, and in nine months from the time he commenced, and two months from the time he became an entire vegetarian, he relinquished alcoholic liquors and has not returned to either flesh or alcohol since.

2. An analytical chemist of some talent, but of intemperate habits, about 32 years of age, was desirous to be cured of his vice. I called his attention to the statement of Liebig. He said he feared that a vegetarian diet would not suit his constitution, and that he felt that he had eaten nothing unless he dined largely on flesh. I told him that I had suffered from the same delusion myself, but I was now convinced of its fallacy, and begged him to give the vegetarian diet a fair trial. He was a bachelor, and had no one to consult but himself, so, after several more objections had been answered, he consented to give it a month's trial. He ate his first vegetarian dinner—which consisted principally of macaroni—with little appetite. Next day I took him a long walk, which detained us three hours beyond his usual dinner hour, so that he returned with such a hearty

appetite that he ate his maccaroni cold, being too impatient to wait until it could be warmed. From that day he persevered, aided by the diet, and before the end of six weeks he was a total abstainer.

3. A lady of independent means, about 42 years of age, accustomed to live freely, eat very largely of meat, drink a bottle of wine daily, besides beer and brandy, was accused by her friends of being intemperate. Her sister, who had great influence over her, took her, by my advice, 100 miles away from home, by the seaside, and after long walks they sat down regularly to a vegetarian dinner. In nine weeks her intemperance was so far cured as to be satisfied with about half a glass of brandy on going to bed, drinking nothing alcoholic during the day.

4. A clergyman of habitually intemperate habits was induced to adopt vegetarianism, and was cured in about 12 months. He was about 44 years of age.

5. A country gentleman, after 11 months of vegetarianism, was entirely cured of intemperance.

6. A girl of 19, who from association with intemperate people had been led into this vice, was cured in about five weeks by vegetarian diet. After two years she went to visit those who had first misled her, and returned to a flesh diet and drunkenness. From this relapse she was cured a second time by vegetarianism. Unfortunately she returned again to a flesh diet and drunkenness, but was again cured a third time.

7, 8, 9. A man, his wife and sister, all above 40, who had been addicted to intemperance for some years, were cured by vegetarianism within one year.

10. A bed-ridden gentleman, slightly addicted to intemperance, was entirely cured by a vegetarian diet in 36 days.

11. A captain in the merchant service was entirely cured of drunkenness in 44 days by the same means.

12. A half-pay officer in the navy was cured of drunkenness by vegetarianism in about 90 days.

13, 14. A clergyman and his wife, both addicted to intemperance, although of a seeret and quiet kind, were cured, one in four months the other in six months.

15, 16, 17. Similar cases, all bachelors of intemperate habits, were cured within 12 months by a diet mainly farinaceous.

18. A gentleman of 60, who had been addicted to intemperate habits for 35 years, his outbreak averaging one a week. His constitution was so shattered that he had great difficulty in insuring his life. After an attack of delirium tremens which nearly ended fatally, two brothers, who had much influence over him, induced him to adopt a farinaceous diet, which cured him entirely in seven months. He was very thin at the beginning of the experiment, but at the end of the seven months had increased in weight 28 lbs., being then about the normal weight for a man of his height.

19, 20. Two sisters, members of a family notorious for their intemperate habits. They were induced to adopt vegetarianism, and were cured in about a year.

21. A clerk of great ability, who had lost several good situations on account of his intemperate habits, adopted vegetarianism as an experiment, and with such perfect success that one of his old employers took him back at a higher salary than he had ever received before.

22. A governess, aged about 40, who lost a good situation on account of her drunkenness, was cured by a farinaceous diet in nine weeks.

23, 24. Both military pensioners, aged respectively 56 and 63, who had contracted habits of intemperance in India. They led wretched lives on small pensions, until induced to adopt vegetarianism. They were cured in about six months.

25, 26, 27. Three old sailors, above 50. They were cured by vegetarianism in about six months.

From these 27 cases, in which the vegetarian system has been within my knowledge successful, I conclude that it is a very valuable remedy, and worth a trial. I

will now give a list of articles of food which are pre-eminent in their antagonism to alcohol.

1st. Maccaroni, which when boiled and flavored with butter is palatable and very substantial. I believe no person can be a drunkard who eats half a pound a day of maccaroni thus prepared.

2d. Haricot beans and green dried peas and lentils stand next. They should be soaked for 24 hours, well boiled with onions, celery, or other herbs, and plenty of butter or oil. Rice is useful, but less important than maccaroni or peas and beans. The various garden vegetables are helpful, but a diet mainly composed of them would not resist alcoholic drinking so effectually as one of maccaroni and farinaceous food.

3d. Highly glutinous bread is of great use from this point of view; it should not be sour, for sour bread has the tendency to encourage alcoholic drinking. Bread that is imperfectly fermented and liable to become sour is in very common use, and, in my opinion, greatly contributes to foster intemperance; as also the use of meat of the second or third quality. The use of salted food tends to promote intemperance, while regular hearty meals of fresh, wholesome, glutinous food tend to discourage it.

I can speak from experience as having benefited in health greatly by adopting a vegetarian diet, and all whom I have induced to adopt it have been benefited likewise. It has the tendency to encourage the development of the intellect; to give increased capacity for mental labor; and to promote longevity and economy. The price of meat is double what it was twenty-five years ago; while the price of wheat, which varies of course with seasons, has not increased. Incomes and wages in general have risen, so that the poor man who is willing to live on wheaten products is better off than ever. He only feels the pressure when he attempts to live greatly on flesh, which induces a thirst for alcoholic liquors, for in all the cases of intemperance which I have

examined there is a special distaste for a farinaceous diet. Those who object to vegetarianism often complain of a want of appetite for such diet. Let such try seaside or mountain air, a good long walk fasting, or a ride on the top of an omnibus, and they will seldom want an appetite. The drunken mechanic, who when sober works hard, loses more time through drunkenness than he would in taking country walks, if such are advisable for his health.

If we inquire the cause of a vegetarian being disinclined to alcoholic liquors, we find that the carbonaceous starch contained in the maccaroni, beans, or oleaginous aliment, appear to render unnecessary, and consequently repulsive, carbon in an alcoholic form. Liebig says "alcohol and fat oil mutually impede the secretion of each other through the skin and lungs." Nations living on a diet composed largely of starch, such as the rice-feeding populations of the tropical East, are less given to drunkenness than meat-eating populations. The meat-eating people of the north of France consume much alcohol per head—as much, if I may believe statistics, as the inhabitants of any part of Europe. The bread they consume is very generally raised with vinegar. One class of fermented food appears to attract another. I have observed that a taste for spicy condiments, butcher's meat and alcoholic liquors is associated, and that a taste for plain-favored vegetables, fats and oils is likewise associated. I have known persons in the habit of taking alcoholic liquors daily, when eating butcher's meat, who find they must give them up entirely when living on a farinaceous diet without meat—their action under those circumstances being too irritating to be endured without great inconvenience—such as sleeplessness, burning in the hands, and headache, and even nausea; and that in the same individual, who a few days before, with a meat diet, seemed to require several glasses of wine to prevent physical exhaustion.

Lastly, were the ground now occupied in growing barley for malting purposes devoted to growing wheat or oats for bread and porridge, our national wealth would be greatly increased. But little wheat would need to be brought from foreign countries at a great expenditure of gold ; while intemperance itself, which is the chief cause of pauperism and crime, may be greatly discouraged by the cultivation of vegetarianism.

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